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HANDBOOK

OF

HARDY TREES, SHRUBS, AND HERBACEOUS PLANTS.

CONTAINING

DESCRIPTIONS, NATIVE COUNTRIES, ETC. OF A SELECTION OF THE BEST SPECIES IN CULTIVATION,

TOGETHER WITH

CULTURAL DETAILS, COMPARATIVE HARDINESS, SUITABILITY FOR DIFFERENT SITUATIONS, ETC.

BASED ON THE FRENCH WORK OF

MESSRS. DECAISNE AND NAUDIN

(MEMBERS OF THE INSTITUTE OF FRANCE)

ENTITLED 'MANUEL DE L'AMATEUR DES JARDINS,'
AND INCLUDING THE ORIGINAL WOODCUTS BY RIOCREUX AND LEBLANC.

BY

W. B. HEMSLEY,

FORMERLY ASSISTANT AT THE HERBARIUM OF THE ROYAL GARDENS, KEW.

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PREFACE.

The principal object of the compiler of this volume is to furnish something between a mere dictionary of names and a scientific treatise containing nothing beyond technical descriptions of plants. No attempt has been made to treat the subject in a popular, gossiping style, for this would involve considerable discursiveness, and consequent additional bulk, without enhancing the usefulness of the work; but only those technical terms in general use, and familiar to almost everybody engaged amongst plants, have been employed. It is, in fact, impossible to describe plants, or any series of objects presenting slight modifications of the same characters, without using special terms of a certain and defined signification. To obviate any difficulty that might arise from ignorance on this point, and to have the explanations at hand, a concise glossary is given of those words which do not carry their meaning with them. But the most superficial knowledge of Systematic Botany will be sufficient to render all the information this work contains intelligible, and only those who have some idea of the subject are likely to consult it. Although considerable space is devoted to Practical Gardening, greater prominence has been given to descriptive garden Botany, because it is believed that this branch of horticultural literature is still far behind all others. It is not supposed that the present work will at once supply the deficiency aimed at, as it is necessarily very imperfect; but as the first of its kind it may serve to smoothe the way for a more elaborate one, and be the means of clearing up some of the errors generally current, as well as leading to the discovery of others. The arrangement of the technical portion according to the natural system appears to be justified by the fact that

almost every young gardener, at least, has some knowledge of it. Another reason for adopting it in preference to alphabetical order or any arbitrary grouping is, that a knowledge of it is desirable, and will serve to increase the pleasure to be derived from the cultivation of plants. The actual arrangement of the orders and genera is a modification of De Candolle's system, as near as possible to that in use at Kew, as published in Hooker and Bentham's 'Genera Plantarum.' Any one acquainted with the affinities of plants will soon be able to turn to the various orders without consulting the index, which for convenience has been made as complete as possible, including the Latin names of all the species described or mentioned, together with their more important synonyms, as well as the popular English and American names.

To facilitate the selection of species, lists and references to the principal members of the different classes are given under the head 'Classification of Plants according to their Duration, Habit, etc.,' pp. 599–619.

It was originally intended to translate certain portions of the first, second, and third volumes of Decaisne and Naudin's 'Manuel de l'Amateur des Jardins,' and make up a volume from them. But this plan was abandoned at the outset, as the arrangement, suitable perhaps for a work of several volumes, could not be carried out in bringing the materials within the limits of one. And then, except in the case of a few genera and species so well known as to scarcely need description, distinguishing generic and specific characters are not given in the French work. This being considered of the first importance, it was decided, whilst using the original woodcuts, and all the information available, to proceed on a totally different basis. A great many of the species mentioned therein are not noticed here, on account of their not being hardy in Britain. On the other hand, numerous additional species are described or named; and although nothing like a complete enumeration of all the hardy plants found in British gardens, very few desirable or common species have been overlooked. Probably some persons may be disappointed at not finding such and such a species mentioned, whilst other less meritorious species are admitted. Imperfections of this nature

are already apparent; but a line must be drawn somewhere, and in the choice of species one is naturally influenced to a certain extent by one's own knowledge and predilections. Under each order, several of the showiest or commonest of its members found wild in Britain are described or noticed. Exceedingly common plants are not technically described, for the simple reason that it is wholly unnecessary; but any interesting facts, such as date of introduction, native country, and other details respecting the changes years of cultivation have effected in well-known plants, like the Dahlia and Aster, are briefly noticed. Very rare plants, and especially those species requiring considerable skill and experience to grow them successfully, are usually mentioned without description. In those instances where there are several often closely allied species of the same genus in cultivation, the peculiar characteristics of each species are as much as possible inserted in the descriptions. It frequently happens that the genus of a plant is well known, but from the similarity of species, or some other cause, its specific identity is not so easily remembered, and hence the value of a book of reference containing the information sought. Plants vary so much under cultivation that, without trustworthy evidence respecting their descent from certain wild types, they would often be considered as specifically distinct from their progenitors; and therefore all descriptions must be accepted subject to the changes a plant is likely to undergo under artificial conditions. To overcome this difficulty as much as possible, the characters of the cultivated plant are given or allusion made to the changes effected by long culture.

The information given under each species is culled from various sources, as it was not practicable to have all the species in a fresh state at the right moment; but only the most trustworthy authorities have been consulted. It should be mentioned here, that although free use has been made of the French work, even to the extent of translating some paragraphs in their entirety, Messrs. Decaisne and Naudin are in no way responsible for the alterations in nomenclature, limitation of species, or any other changes that have been introduced. Naturally, we might expect to find some errors in sifting a

work of this description, and equally as a matter of course, whilst correcting them, we have committed others. As nothing is more difficult than to discover our own mistakes, the compiler would feel obliged to anybody for corrections, and for suggestions respecting additional information. The nomenclature of the Coniferæ is perhaps the least satisfactory, on account of the difficulty experienced in identifying the cultivated forms with their wild parents. So many of them appear, even in a natural state, under two or more very different forms; and in the case of dicœcious species the determinations frequently admit of great doubts regarding their accuracy. These doubts cannot be cleared up in the absence of cones or adult development. But, after all, the correct original name is not of so much importance to the cultivator as the value of the plant in question for useful or ornamental purposes, though it is desirable to know what is meant by a certain name, and whether this name be restricted to one form, or, as is too often the case, applied to several distinct things. It may be objected that there is a want of uniformity in the present work, and that too much prominence is accorded to some genera, whilst others, whose species are equally difficult of discrimination, are treated less in detail. Doubtless this is true, and it can only be pleaded in extenuation that the desire to keep within the limits of a handy volume was the only influence that impelled us to this course. The selection may not be in every instance the best, but it is thought that details respecting the history of 'florist's flowers,' like the Aster, Dahlia, and Rose, and descriptions of all the species in cultivation belonging to a genus like *Lilium*, will be more acceptable than a complete description of the rarer plants in cultivation. As a rule, those who make large collections are botanists, possessing a more or less extensive botanical library. This work being intended for amateurs and gardeners of limited scientific attainments, everything has been simplified so far as is consistent with perspicuity. In nearly all cases information respecting the structure of the ovary, and the position, number, and form of the ovules in different orders has been omitted, the mature seed-vessel, or fruit, and its contents alone being described. For the use of those unacquainted with Greek and

Latin, the derivation of the generic names is given, as a knowledge of the signification of a name materially assists in impressing it on the mind, or recalling it on seeing the plant to which it has been given. The specific names of frequent occurrence, with their meanings, are included in the glossary of terms. The relative size of the woodcuts to the plants they represent is approximatively given, in order to enable the reader to form a better judgment.

The Second Part, devoted to Practical Gardening, calls for no special remark, further than to say that it was not written for the guidance of those advanced in the art of cultivating and arranging plants, and laying out a garden.

A companion volume, devoted to Greenhouse and Hothouse Plants, is contemplated, should this meet with sufficient favour to justify the belief that such a work is needed.

In conclusion, my best thanks are due to Professor Oliver and Dr. Masters, who have materially assisted and advised me; but I more especially wish to record my obligations to Mr. J. G. Baker, F.L.S., who kindly checked all the proofs as they issued from the press, thereby correcting many important errors which, in the absence of an adequate library, I should not have detected; and also kindly permitted the use of his researches in the petaloid Monocotyledonous plants.

Errata

Page 27, line 13 from foot, *for* tetramerous, *read* trimerous.
„ 43, „ 2, for CORYDÀLIS, read CORÝDALIS.
„ 46, „ 6, for CARDAMÍNE, read CARDAMÌNE.
„ 208, „ 10 from foot, for *Compósiteæ*, read *Compósitæ*.
„ 215, „ 14 from foot, for **CORNACEÆ**, read **CORNÀCEÆ**.
„ 265, „ 6, for *Cyànus*, read *Cỳanus*.
„ 408, „ 9, for **CUPULIFERÆ**, read **CUPULÍFERÆ**.

CONTENTS.

PAGE

PREFACE v

INTRODUCTION: GENERAL REMARKS—SCIENTIFIC CLASSIFICATION OF PLANTS—NOMENCLATURE—ACCENT—GEOGRAPHY OF HARDY PLANTS—KEY TO NATURAL ORDERS—GLOSSARY xiii

PART I.

DESCRIPTIONS, ETC., OF HARDY PLANTS . . . 1–554

PART II.

CHAPTER I. CULTIVATION OF PLANTS 555

§ 1. Vegetable Physiology and Economy considered in their relations to Horticulture, 555: 1. Germination, 556; 2. Absorption, 558; 3. Respiration, 560.

§ 2. Climate, its influence on Vegetation, 563.

§ 3. Soils, their Nature and Composition, 568.

§ 4. Cultural Directions: 1. General Remarks, 572; 2. Culture and Propagation of Plants belonging to the Heath and Allied Tribes, 582; 3. Culture and Propagation of Roses, 584; 4. Culture of Herbaceous Plants, General Remarks, 586; 5. Culture of Bulbous and Tuberous-rooted Plants, 590; *a*. Tulip, Gladiolus, and their Allies, 590; *b*. Lilies and their Allies, 592; *c*. Ranunculuses and Anemones, 594; 6. Culture of Annuals and Biennials, 595; 7. Culture of Tender Perennial Bedding Plants, 598.

PAGE

CHAPTER II. CLASSIFICATION OF PLANTS ACCORDING TO THEIR DURATION, HABIT, ETC. 599

I. WOODY PLANTS, 599: 1. **Arborescent,** 599; *a.* Evergreen Trees, 600; *b.* Deciduous Trees with ornamental foliage, 601; with conspicuous Flowers, 602; with variegated or coloured foliage, 602; with brightly coloured bark, 603; with cut or dissected foliage, 603; with pendulous branches, 603. 2. **Frutescent,** 604; *a.* Evergreen shrubs, 604; *b.* Deciduous shrubs, 606; *c.* Climbing, trailing, or twining shrubs, 607; *d.* Shrubs requiring the protection of a wall or other shelter, 609.

II. HERBACEOUS PLANTS, 609; *a.* **Perennial Herbs,** 610; Florist's Flowers, 611; ornamental foliage, 611; climbing, twining, or creeping, 613; of large stature, with conspicuous flowers, 613; of medium size, with conspicuous flowers, 613; with bulbous, tuberous, or rhizomatous roots, 614; aquatic and marsh, 615; *b.* **Annual or Biennial Herbs,** 616.

CHAPTER III. ORNAMENTAL GARDENING. . . . 620

General considerations, 620; effective arrangement of colours, 630; selection of Plants according to colours, 630; embellishments of the parterre in Winter and Spring, 635; arrangement and planting of small gardens, 636; selections of trees, shrubs, and herbaceous plants suitable for a small garden, 638; sea-side planting, 642; town planting, 644.

INDEX OF THE ENGLISH AND LATIN NAMES OF THE PLANTS DESCRIBED IN PART I. 647

INTRODUCTION.

Within the last few years horticulturists generally have evinced an increasing desire to study the physiology and structural affinities of plants, as well as the art of growing them successfully. This has arisen doubtless from the fact that such knowledge tends to a clearer understanding of the laws governing the hybridisation of plants, and the great variety of forms they assume when subjected to artificial conditions. Not that botanical science is so far advanced as to be able to explain satisfactorily all the numerous phenomena of plant-life brought to light by cultivators. But much may be expected to result from the combination of science with practice. Experiments will be carried out in a more systematic manner, and the results more carefully recorded by those possessing sufficient knowledge to render their labours interesting beyond the commercial value or beauty of the varieties raised. Botanists can only theorise on many questions that gardeners have in their power to prove or disprove.

Basis of Classification.—The characters upon which systematic classification is founded, reside chiefly in the various modifications of the organs of reproduction and the floral envelopes. Distinguishing the organs of a plant into two sets—those concerned in its reproduction, and those that perform its nutrition—we expect in a genus some material recognisable difference in the former, or, in other words, we put together in one and the same genus all the species known which have the different parts of their flowers constructed and arranged upon the same plan; and when there are constant differences between plants which have the same plan of structure we say that these latter are distinct species. Apply this to such a clearly marked

genus as Rosa or Lilium, and the application of this plan will be clearly seen. Perhaps nothing is more artificial, in a sense, than the so-called natural system of botanists. Scarcely two botanists agree as to what should constitute an order, a genus, or a species. These differences of opinion often appear greater than what they really are, for they all resolve themselves into the question of the value to be attached to certain characters. The cultivation of plants and comparisons of the same species from different parts of the world, have taught us that variability, more or less rapid or wide according to conditions and circumstances, is a prominent feature of most species under observation. What the limits of this variability are, nobody has yet determined, and some declare it to be illimitable. But this is not the place to discuss the stability of species; suffice it to say that for all practical purposes there is little difficulty. With the horticulturist it becomes a question whether a certain plant, whatever rank we may assign to it, be worthy of cultivation, either for its use or beauty. And this point decided, there is little to prevent him from ascertaining whether it will be better to propagate it direct from seed, or by some non-sexual means, as from cuttings, grafting, etc. Of course the method adopted will depend upon the easiest way of transmitting it pure.

There are no general rules by which botanists are guided in defining species. In some groups of plants, certain organs appear to be so constant in their form, number, hairiness, etc., as to characterise species, whilst the same set of organs in another group of plants vary so much as to be of no use in distinguishing species, and consequently the botanist has recourse to a different set of organs, affording more permanent and reliable characters. This, coupled with the variation of plants under diverse conditions, will explain the difficulties experienced in determining species from written descriptions. Indeed, it may safely be averred that the most accomplished botanists often fail, after careful study, to identify a plant with its description, even when that description is as perfect as it is possible to make it from half-a-dozen or more specimens; and it is usually considered necessary to compare the new specimen with the original in the case of little known species. We

make this statement here simply for the purpose of warning beginners against depending too much upon descriptions, without collateral knowledge, and against being hasty in their decisions. It is hardly necessary to add that no person can expect to become acquainted with the names of plants by the use of books alone. There must be preliminary practical knowledge to render the study of botanical works profitable. As a rule we learn the names, and little more, of a great many plants, and we often go on loading our brains with these names until there is a break-down, because they are not associated with any peculiar characters possessed by their owners, but are simply based upon general appearance. Hence the need of a book of reference to refresh the memory, and *assist* in determining the correct name of a plant. From what we have said respecting the variability of plants, it naturally follows that all descriptions are more or less comparative in their distinctions, that is to say, without having any particular standard or starting-point, we frequently employ the words small and large, and many other terms, in describing plants of this or that group, and therefore these terms are qualified to a certain extent by the general characteristics of the plants under consideration. It is far more hazardous to give dimensions without allowing a wide margin for variation, than to limit the description to distinguishing characteristics and relative size, hairiness, etc. This course has been followed to a great extent in the present work, and it is confidently believed that it will meet with approval, and be of more service than disconnected, though more complete descriptions.

Botanical and Horticultural Nomenclature.—With regard to the nomenclature of plants, we have endeavoured to select the names sanctioned by recognised authorities; and in cases where plants are more generally known under erroneous appellations, these are given. In many instances plants possess two or more names. This may have proceeded from different botanists having published descriptions of the same plants unknown to each other, or it may rest upon the views entertained respecting the definition of a genus or species. Oftentimes, however, the advance of knowledge has rendered it necessary or desirable to change the name of a plant. Familiar

and important synonyms are quoted to show that they belong to certain plants, and that a plant may, in some instances, bear either of two names with equal propriety, though, generally speaking, the one adopted by the writer who has made that particular class of plants his study is the one to be preferred. It was not thought desirable to encumber the work with the authorities for each name, but where diverse species have received the same name from different authors, the authority is given for the cultivated form or forms. It is the general practice to give garden varieties trivial names, such as those of noted personages, or English or French names denoting some property or peculiarity. And the names of hybrid plants are usually prefixed by a *, to distinguish them from wild forms. For several reasons, the use of Latin and Greek names is more properly restricted to wild forms, but more especially as an indication of the origin of the plant in question.

Accent.—To those unacquainted with the dead languages, and especially Latin, many of the names given to plants appear almost unpronounceable; and as we give the derivation of most of them, explaining their signification, so we have also marked the syllable on which the accent falls, to indicate their pronunciation. All the letters are pronounced, including the final *e*, and they are commonly sounded, according to their position, as in ordinary English words. But some people affect what is presumed to be the correct pronunciation, according to the Latin language, though there is a wide difference of opinion and usage on this point. With the exception perhaps of the broad sound of the letter *a*, and the short sound of the letter *i*, it is safer to pronounce them as English words, subject of course to the difference in accent. There are several ways of marking the accented syllable, but the method adopted in this work is as simple as any yet devised. Some of the names are not correctly accented, because the accents, having to be let in between the lines, are so apt to get displaced. The sign of accent rises from the vowel in the direction of the following consonant, when that is sounded with it; or in the direction of the preceding consonant, when the following consonant does not belong to the accented syllable. Thus, *Anemòne élegans*, *Adònis vernàlis*, and *Hellèborus*

víridis, are pronounced An-e-mō-ne él-e-gans, A-dō-nis ver-nâ-lis, and Hel-léb-o-rus vír-i-dis. Or, to render our meaning more clear, Anemo'ne el'egans, Ado'nis verna'lis, and Helleb'orus vir'idis. The few exceptions to the foregoing rule, as, for instance, where two or more vowels come together, seem to require no explanation, as no difficulty is likely to be experienced in ascertaining the correct pronunciation.

Geography of Plants hardy in the British Isles.—In the chapter on Climate will be found some information respecting the countries which furnish the greater part of the exotic plants hardy in Britain. The few remarks to be made here refer to the classes of hardy plants inhabiting different regions. Every part of the world has what is termed its characteristic vegetation, depending to a certain extent upon climate and soil, but probably more upon other causes which have been variously explained by different investigators. We have only to speak of facts as they are, without any speculations as to the agencies which have operated to bring them into existence. Experience teaches us that plants are not by any means distributed and confined, in a wild state, to localities best suited to them, or where alone they will flourish. Frequently we find that plants attain a development unknown in their natural state, when conveyed to a distant part of the world possessing a similar climate. This may be attributed, in a great measure, to freshness of soil. In our Australian colonies, for example, many of our common weeds have been introduced with grain and cereals, and in many instances where they have escaped beyond the limits of cultivation, they have taken complete possession of the soil, to the total exclusion of the native vegetation. In course of time the vigour of these introduced plants diminishes, and they are gradually reduced to more equal terms with the native plants. This fact supplies a valuable hint to the cultivator respecting the importance of change of soil, and explains the relative fertility of freshly-broken land. But this is a digression: we were about to speak of the different classes of plants characterising the vegetation of various regions possessing a similar climate to our own. Taking first of all the Coniferæ, the members of which, with few exceptions, are evergreen, we find that the majority come

from North America, especially the north-western regions, between 40° and 60° N. lat., and Japan. From North America we have the gigantic Sequoias, the stately Piceas and Abies, and many species of Pinus, together with some of the handsomest of the Cupressineæ. Japan and Northern China furnish us with many beautiful forms of Biota orientalis, several species of Juniperus and Retinospora, and the peculiar forms illustrated by such species as Cephalotaxus drupacea, Thuiopsis dolabrata, Sciadopitys verticillata, Salisburia adiantifolia, Cunninghamia Sinensis, and Cryptomeria Japonica. In addition we have the hardy European species, a few from the mountains of India and Mexico, and one or two outliers, like Araucaria imbricata and Fitzroya Patagonica, from South America. Most of the Mexican species are too tender for our climate; but India furnishes us with a few of the handsomest species in cultivation, as, for example, Cedrus Deodara, and Pinus excelsa. Evergreen trees and shrubs not belonging to the Coniferous tribe sufficiently hardy for cultivation in the open air, are chiefly from the South of Europe and Japan. As examples of South European species we may name the Sweet Bay, Laurestine, Portugal and Common Laurels, Evergreen Oak, Phillyrea and Heaths. The Japanese region contributes the well-known Aucuba, numerous forms of which have recently been introduced, Euonymus, Eurya, Berberis, Ligustrum coriaceum, and several others, most of which, however, are too tender, except for the warmer parts of the kingdom. Asia Minor contributes Rhododendron Ponticum, and North America, and the mountains of India are the native countries of most of the other cultivated species of this beautiful genus. Kalmia, and several other less important Ericaceæ, are from North America. South America contributes Berberis Darwinii and other species, Escallonia species, Pernettya mucronata, Fabiana imbricata, Lardizabala biternata, and the quasi-deciduous Buddlea globosa. The eastern and central regions of North America are as rich in deciduous as the west is in evergreen trees, including numerous Oaks, Maples, Hickories, Chestnuts, and several Magnolias, Limes, Elms, Poplars, Robinias, and the Tulip Tree. Shrubs cultivated mainly for the beauty of their flowers are also abundantly represented in North America, *e.g.* Spiræa,

Ribes, Philadelphus, Azalea, Ceanothus Calycanthus, Cratægus and Bignonia. Japan furnishes us with the beautiful Deutzias, Diervillas, Hydrangeas, Pyrus Japonica, Kerria, Forsythia, various species of Clematis, etc. From the South of Europe and Asia Minor we have Azalea Pontica, Hibiscus Syriacus, Cercis Siliquastrum, various Cisti and Leguminosæ, including the Laburnum, several species of Cytisus, Genista and Spartium. Siberia and Northern China furnish us with several noteworthy outliers of different families, whose members are chiefly natives of warmer regions, such as Kœlreuteria paniculata, Ailanthus glandulosa, Xanthoceras sorbifolia, Phellodendron Amurense, Eleutherococcus senticosus and Fortunæa Chinensis: with the exception of the first two, these are recent introductions. Caragana and Halimodendron are two very hardy genera from Siberia. Some of the foregoing extend to Japan, and we have also many other very handsome, though mostly tender, deciduous trees from the same country. Sophora Japonica is the best known and the hardiest of them. The beautiful forms of Acer polymorphum are, unfortunately, too tender to withstand the winters in the greater part of Britain. Amongst the remaining deciduous trees from Japan, we may name the genera Ulmus, Planera, Pterocarya, Melia, Rhus, Broussonetia, and Salix. There are few trees or shrubs from Australasia hardy enough to withstand the climate of any part of the kingdom, with the exception of the Scilly and Channel Islands.

Herbaceous vegetation characterises nearly all temperate regions, but more especially the northern. The proportion of woody to herbaceous species is much higher in the southern hemisphere, and the general appearance of the majority of the herbaceous species is very different to what we are accustomed to in our native plants, even in species belonging to European genera. Although there are no hardy shrubs from New Zealand, some of the herbaceous plants will succeed in the open air with us, as they are less exposed to the effects of sharp frost; but very few are grown, being for the greater part more curious than beautiful. Libertia ixioides is from New Zealand, and the magnificent Chrysobactron Rossii is a native of the Auckland Islands. Myosotidium nobile is, so far as at present known, peculiar to Chatham Island. Doubtless many other

species would prove hardy in the south-western parts of the kingdom. The temperate parts of South America are also barely represented in our borders. Geum Chiloense, Loasa aurantiaca, Fuchsia macrostema, and the less known, somewhat tender Gunnera scabra, are the nearest approach to hardy subjects from that part of the world. South Africa, although nearly 20° farther north, contributes many more species than South America. They are chiefly bulbous plants, or belonging to the Liliaceæ and Irideæ, to which we shall allude again below. Classifying herbaceous plants according to duration and hardiness, we shall see whence we obtain the greater part of the more familiar species.

Annuals, hardy and half-hardy, find their maximum in California and Mexico, where they are exceedingly numerous and diversified. A reference to the following orders will be sufficient to give an idea of the richness of this region in plants of annual duration. Papaveraceæ, Cruciferæ, Onagrarieæ, Compositæ, Polemoniaceæ, Hydrophyllaceæ, and Scrophularineæ. The region ranking next in order of richness is the Mediterranean—South of Europe, North Africa, and Asia Minor. As examples we may mention: Candytuft, Virginian Stock, Mignonette, Convolvulus tricolor, Larkspur, Sweet Pea, Common Marigold, Ten-Week and other Stocks, and Lavatera trimestris. In addition there are numerous species belonging to the Caryophylleæ, Cruciferæ, Compositæ, and other orders. Australasia furnishes a few half-hardy, the most noteworthy of which are those bearing 'everlasting flowers,' belonging to the genera Helichrysum, Helipterum, Waitzia (Morna), and Rhodanthe, all members of the Compositæ. Chili also contributes a few half-hardy species, as Portulaca, Calandrinia, Salpiglossis, Schizopetalon (hardy), and Schizanthus. From South Africa the number is still more limited, and none of the species are in general cultivation. Mesembryanthemum tricolor, Kaulfussia amelloides, Heliophila spp., Grammanthes gentianoides, and Venidium calendulaceum are natives of that region. Japan and China, both so rich in ornamental evergreen trees and shrubs, and perennial herbs, add scarcely any remarkable species to our list of annuals. Callistephus hortensis, the China Aster, is, however, an important exception.

For the rest, we have a few odd annuals from India, North-east America, and the tropical regions of South America, and various parts of Europe and Northern Asia; for example, Amaranthus spp. from India, and Tropæolum spp. from South America.

Biennials, as a class, are not very numerously represented in gardens, and the majority of them if sown early will flower the same season, though in a natural way the seed would germinate soon after it is shed in autumn. They occur in all regions where there is herbaceous vegetation. The principal species are enumerated with the annuals, at page 617.

Perennial herbaceous plants, as we have stated above, are very abundant in almost all parts of the temperate regions of the northern hemisphere. Those termed Alpine plants, that is, growing in mountainous districts at a considerable altitude, are strongly represented in Europe. Indeed, by far the larger proportion in cultivation are natives of the Alps proper and the Pyrenees. Returning to the plains, North America stands perhaps in the foremost rank; but as many of the species are of comparatively recent introduction, they are not so rich in garden varieties as those belonging to the Old World. The following are some of the better known genera: Phlox Pentstemon, Œnothera, Aster, Lilium, Lupinus, Aquilegia, Spiræa, and Helianthus; to which might be added many others belonging to the Malvaceæ, Compositæ, Scrophularineæ, etc. Besides the Alpine species alluded to above, Europe furnishes us with a large number of our familiar perennials; and, if we include North Africa and Asia Minor, we have a considerable proportion of those in general cultivation: Anemone, Ranunculus, Wallflower, Carnation, Pink, Pæonia, Auricula, Hyacinth, Hollyhock, Campanula, Chrysanthemum (Pyrethrum) roseum, Myosotis, Violet, Pansy, Tulip, Crocus, Narcissus, Antirrhinum, Saxifrage and Lilium, will serve to illustrate this region. Japan and China, taken together, offer many curious and interesting species. And from these countries we may mention that we have a large number of garden varieties, not only of herbaceous plants, but also of shrubs introduced by various travellers. The most important genus is Chrysanthemum. Spiræa palmata, Dielytra spectabilis, Pæonia Moutàn, Primula

Japonica, Anemone Japonica, Lilium auratum, and several other species; Funckia, Aspidistra, and Bocconia make up a list of attractive plants. South Africa contributes a large number of bulbous plants, belonging chiefly to the Irideæ, Liliaceæ, and Amaryllideæ. The magnificent hybrid Gladioli in cultivation are the offspring of South African species. Kniphofia aloides (Tritoma uvaria) and Agapanthus umbellatus are two valuable plants from the same country. South America furnishes very few beyond those already mentioned; but we must not forget to mention the noble Pampas Grass (Gynerium argenteum). India is also poorly represented in our gardens, though many of the mountain plants are quite hardy.

The geography of the tender species employed for summer bedding does not come within our province, but nearly all of them are mentioned or described, and their native countries given in the body of the work.

Artificial Key to the Natural Orders and Anomalous Genera.—The following Key is intended to assist in ascertaining the order to which a plant belongs. It should be observed, however, that some acquaintance with the rudiments of Descriptive Botany is necessary to enable a person to use it profitably. And it should also be borne in mind that there are many plants deficient in one or more of the characters upon which the groups or classes to which they are referred are founded. In such cases the general characters and structure of a species decide its position in a natural arrangement of plants. Of course there are differences of opinion in regard to these matters, as some botanists attach greater importance than others to the presence or absence of certain organs. In fact, some orders, as the Juglandaceæ and Loranthaceæ, are placed in different divisions by different writers. As an example of the apparently arbitrary grouping of plants, we may refer to the apetalous genera of the Ranunculaceæ: Clematis, Anemone, Caltha, Helleborus, etc. Orders possessing genera wanting in any of the main characters of their division are included in the key under two or more divisions. This key is based upon that given in Lindley's 'Vegetable Kingdom,' and modified according to the scope of the present work, with the addition of habit, duration, etc., of the species.

Trees, shrubs, or herbs with more or less conspicuous unisexual or bisexual flowers and seeds containing a distinct embryo
Phænogamous Plants, 1

Trees or herbs (Ferns, Horsetails, Mosses, Seaweeds, Fungi, &c.), without staminate or pistillate flowers; seeds (spores) destitute of an embryo *Cryptogamous Plants*, p. 542

1
- Stem when perennial consisting of a central pith, concentric layers of wood, and a separable bark, increasing in size by the formation of additional layers beneath the bark, the latter expanding or renewing itself in proportion to the growth of wood. Leaves net-veined. Parts of the flower free or united, usually in fours or fives or some multiple of these numbers. Floral envelopes when present consisting of a distinct calyx and corolla, the former usually green and the latter coloured; or all the series similar, and then termed a perianth; or the sexual organs without any distinct whorl of investing organs, though sometimes subtended by bracts. Seeds with two opposite entire or divided cotyledons . *Dicotyledons*, 2
- Stem destitute of central pith, not increasing in diameter by annual layers, vascular bundles irregularly scattered amongst the cellular tissue. Leaves usually parallel-veined (or rarely net-veined, as in the Aroideæ, Smilacineæ, and one or two other orders). Parts of the flower usually in threes. Floral envelopes in one or two series, free or united in some degree, usually all coloured and similar in form, sometimes reduced to scales or scaly bracts, as in Grasses and Sedges. Seeds with one cotyledon . *Monocotyledons*, 3

2
- Ovules enclosed in an ovary (all orders excepting Coniferæ and Gnetaceæ) *Angiospermæ*, 4
- Ovules not enclosed in an ovary . *Gymnospermæ* (*Coniferæ* and *Gnetaceæ*) p. 419–457

4
- Petals when present free to the base or very slightly united, as in some Malvaceæ *Polypetalæ*, p. 1
- Petals usually united, forming a monopetalous corolla, or rarely almost free, as in some Ericaceæ . . . *Gamopetalæ*, p. 218
- Petals none (in the plants described in this work). Perianth usually inconspicuous, sometimes coloured, as in Mirabilis; or none, as in the Cupuliferæ, Coniferæ, etc. *Apetalæ*, p. 382

3
- Perianth usually composed of six segments in two whorls, all or some of them coloured, rarely green. Some of the plants belonging to this division have small inconspicuous flowers, destitute of a regular perianth, e.g. Aroideæ, Typhaceæ . . . *Petaloideæ*, p. 458
- Perianth none, or reduced to minute scales. Flowers often arranged in spikelets, and enclosed in imbricated membranous or coriaceous bracts, termed glumes. Fruits (in the orders referred to in this work) 1-celled, 1-seeded, the perianth-scales usually adhering to the fruits *Glumiferæ*, p. 537

Sub-class I.—DICOTYLEDONS or EXOGENS.

1. Flowers having both calyx and corolla; petals free.

A. Stamens more than twenty.

§ Ovary inferior or partially so.

† Leaves alternate, stipulate.
* Carpels more or less united, often forming a fleshy fruit.
Trees and shrubs having white, pink, or scarlet flowers, *Rosaceæ*, tribe *Pomeæ*, page 171

†† Leaves exstipulate.
Placentas spread over the dissepiments.
Water-plants with showy flowers and orbicular floating leaves *Nymphæaceæ*, p. 34
Placentas parietal.
Petals definite in number, distinct from the calyx. Climbing or trailing herbs with hispid, often pungent hairs, *Loaseæ*, p. 203
Sepals and petals numerous, passing gradually from one into the other. Fleshy, often prickly plants. *Cacteæ*, p. 208
Placentas axile.
Shrubs having opposite leaves furnished with translucent dots *Myrtaceæ*, p. 193
Petals very numerous. Trailing herbs with fleshy leaves, *Ficoideæ*, p. 208
Petals few, strap-shaped. Trees with simple alternate deciduous leaves and small capitate polygamous flowers *Nyssa*, p. 217
Petals few, oval or oblong. Shrubs with deciduous, opposite leaves, and white, fragrant flowers *Philadelphus*, p. 185

§§ Ovary wholly superior.
† Leaves stipulate.
* Carpels more or less distinct (at least when young), or solitary.
Stamens hypogynous.
Carpels numerous. Trees or shrubs having alternate stipulate leaves and usually showy fragrant flowers, *Magnoliaceæ*, p. 23
Stamens perigynous.
Carpel one *Rosaceæ* tribe *Pruneæ*, p. 140
Carpel more than one *Rosaceæ*, p. 142–170
** Carpels wholly combined into a solid pistil, with more placentas than one.
Calyx with an imbricated æstivation.
Placentas parietal.
Shrubs with alternate or opposite leaves and showy fugacious flowers having crumpled petals *Cistineæ*, p. 55
Placentas axile.
Trailing herbs with succulent leaves and showy flowers having a calyx of two sepals united at the base, *Portulaceæ*, p. 74
Calyx with a valvate æstivation.
Stamens monadelphous.
Anthers 2-celled. Deciduous shrub with petaloid yellow sepals *Fremontia*, p. 84
Anthers 1-celled. Herbs or shrubs having showy flowers. Petals usually oblique and twisted in æstivation *Malvaceæ*, p. 79

Stamens quite free. Large trees with simple deciduous leaves and rather small flowers . . . *Tilia*, page 84

†† Leaves exstipulate.

* Carpels more or less distinct (at least when young), or solitary.

Stamens perigynous.

Carpel solitary. Deciduous or evergreen trees or shrubs with alternate leaves and white or pink flowers, *Rosaceæ*, tribe *Pruneæ*, p. 140

Carpels more than one. Herbs or shrubs, various, *Rosaceæ*, p. 142–170

Stamens hypogynous.

Herbs with regular or irregular bisexual flowers *Ranunculaceæ*, p. 1

Climbing shrubs with unisexual inconspicuous flowers and spicate or capitate carpels, *Magnoliaceæ*, tribe *Schizandreæ*, p. 26

Trees or shrubs with alternate leaves, dull-coloured trimerous [1] flowers and aromatic ruminated albumen, *Anonaceæ*, p. 27

Shrubs or herbs with simple opposite dotted leaves and yellow flowers; stamens united in bundles *Hypericineæ*, p. 76

Shrubs or trees with trifoliolate pinnate or rarely simple leaves and inconspicuous flowers . *Anacardiaceæ*, p. 111

** Carpels combined forming a syncarpous fruit, having more than one placenta.

Placentas parietal, in distinct lines.

Juice watery. A spiny shrub with simple leaves and white flowers, seed vessel elevated on a long stalk, *Capparis*, p. 53

Juice milky. Herbs having showy evanescent flowers, *Papaveraceæ*, p. 36

Placentas spread over the dissepiments. Water-plants with showy white or yellow flowers and floating orbicular leaves *Nymphæaceæ*, p. 34

Placentas axile.

Stigma simple.

Ovary 1-celled, with a free central placenta. Herbs having succulent leaves and showy flowers *Portulaceæ*, p. 74

Ovary many-celled. Stamens hypogynous; petals crumpled; seeds numerous. Shrubs with fugacious yellow or white flowers . . *Cistineæ*, p. 55

B. Stamens fewer than twenty.

§ Ovary inferior or partially so.

† Leaves stipulate.

Placentas axile.

Flowers completely unisexual. Herbs having unsymmetrical flowers and an angular or winged fruit *Begoniaceæ*, p. 207

Flowers hermaphrodite or polygamous. Stamens of the

[1] Incorrectly termed 'tetramerous' at page 27.

same number and opposite the petals. Evergreen or deciduous shrubs with small, usually inconspicuous flowers *Rhamnaceæ*, page 101

†† Leaves exstipulate.

Placentas parietal.

Flowers completely unisexual. Perennials or tender annuals having entire or palmately lobed usually hispid leaves, unattractive flowers and ornamental fruits (Gourds) *Cucurbitaceæ*, p. 206

Flowers hermaphrodite or polygamous. Shrubs with alternate deciduous leaves and small racemose flowers, *Ribes*, p. 187

Placentas axile.

Flowers umbellate.

Herbs or rarely shrubs with small flowers, two styles, and usually compound or lobed leaves . *Umbelliferæ*, p. 209

Shrubs or trees with small flowers and usually three or more styles *Araliaceæ*, p. 213

Flowers not umbellate.

Carpel solitary.

Petals or segments of perianth triangular; stamens of the same number and opposite to them. Parasitical shrubs having thick oblong leaves and inconspicuous flowers followed by viscid white berries, *Loranthaceæ*, p. 397

Petals hood-shaped or deficient. Large herbs with prickly Rhubarb-like leaves and dense conical spikes of small flowers . . . *Gunnera*, p. 192

Petals oblong. Shrubs having small flowers and aromatic or balsamic leaves . *Anacardiaceæ*, p. 111

Carpels spreading at the apex.

Leaves alternate. Herbs . . *Saxifrageæ*, p. 178

Leaves opposite. Shrubs often having large sterile apetalous flowers with coloured calyces *Saxifrageæ*, tribe *Hydrangeæ*, p. 182

Carpels parallel, combined.

Calyx valvate; stamens opposite the petals. Shrubs having alternate leaves, and small green, yellow, blue or white flowers . . . *Rhamnaceæ*, p. 101

Calyx valvate; stamens alternate with the petals.

Herbs or shrubs with showy flowers and exalbuminous seeds . . . *Onagrarieæ*, p. 196

Shrubs with inconspicuous flowers and simple, deciduous, or persistent leaves. Seeds albuminous *Cornaceæ*, p. 215

Calyx not valvate.

Anthers spurred at the base. Herbaceous plants with opposite ribbed leaves . . *Rhexia*, p. 194

Anthers not spurred,

Leaves dotted. Evergreen shrub with white fragrant flowers *Myrtus*, p. 194

Leaves not dotted.

Flowers tetramerous . . . *Onagrarieæ*, p. 196

Flowers not tetramerous.
Shrubs with persistent coriaceous leaves and red or white flowers . *Escallonia*, page 186

§§ Ovary wholly superior.
† Leaves stipulate.
* Carpels distinct or solitary.
Anthers with recurved valves. Evergreen or deciduous shrubs with yellow flowers . . . *Berberideæ*, p. 28
Anthers opening longitudinally.
Fruit leguminous (a pod). Herbs, shrubs, or trees with usually alternate compound leaves, irregular (pea-shaped) flowers, and more or less united stamens, *Leguminosæ*, p. 113
Fruit drupaceous or capsular. Herbs or shrubs *Rosaceæ*, p. 142–171
** Carpels consolidated together with more placentas than one.
Placentas parietal.
Flowers with a whorl of appendages termed a corona. Climbing plants with alternate lobed leaves and tendrils *Passifloreæ*, p. 205
Flowers small and inconspicuous. Tufted scapigerous herbs with glandular leaves circinate in vernation *Droseraceæ*, p. 191
Flowers irregular, showy, usually fragrant; petals saccate or spurred. Herbs with entire or divided leaves, solitary axillary flowers, and a dry capsular fruit *Violarieæ*, p. 57
Placentas axile.
Styles distinct to the base.
Calyx imbricated. Stamens perigynous. Scapigerous tufted herbs with alternate leaves, Tribe *Saxifrageæ*, p. 178
Calyx valvate. Trees with simple alternate cordate leaves and greenish-yellow cymose flowers remarkable for the broad bract adnate to the peduncle *Tiliaceæ*, p. 84
Styles more or less combined, proceeding from the base of the carpels (gynobasic).
Gynobase dry. Fruit beaked. Herbs having usually alternate leaves and umbellate solitary or geminate flowers . . *Geranium* and *Pelargonium*, p. 88
Gynobase dry. Fruits not beaked. Herbs with 3- or 4-foliolate leaves and umbellate flowers . *Oxalis*, p. 93
Styles more or less combined, not gynobasic.
Calyx more or less imbricated. Shrubs or trees having deciduous alternate or opposite leaves and unsymmetrical flowers . . *Sapindaceæ*, p. 104
Calyx slightly imbricated; sepals only two. Herbs with simple leaves *Portulaceæ*, p. 74
Calyx valvate or open.
Stamens opposite to petals and equal to them in number.

Stamens perigynous. Erect shrubs with simple leaves and inconspicuous flowers *Rhamneæ*, page 101
Stamens hypogynous. Petals cohering at the tips and falling off without separating. Climbing shrubs . . . *Ampelideæ*, p. 103

†† Leaves exstipulate.
* Carpels more or less distinct or solitary.
Anthers opening by recurved valves. Evergreen or deciduous shrubs with yellow flowers *Berberideæ*, p. 28
Anthers opening longitudinally.
Fruit leguminous. Herbs, shrubs, or trees usually having compound leaves and irregular flowers *Leguminosæ*, p. 113
Fruit not leguminous.
One hypogynous scale on the base of each carpel. Succulent herbs with cymose flowers . *Crassulaceæ*, p. 188
Two hypogynous scales at the base of each carpel. Scapigerous herbs with the parts of the flowers in fours *Francoa*, p. 182
Carpels without hypogynous scales.
Albumen very abundant; embryo minute.
Flowers unisexual or polygamous. Climbing shrubs with divided leaves and purplish flowers *Akebia* and *Lardizabala*, p. 34
Flowers hermaphrodite.
Herbs. Albumen solid . . *Ranunculaceæ*, p. 1
Shrubs. Albumen ruminated . . *Anonaceæ*, p. 27
Albumen in small quantity or wanting.
Carpels several, all perfect.
Carpels enclosed in the urceolate torus. Shrubs with opposite deciduous simple leaves, and fragrant aromatic flowers having the sepals and petals in several series, passing gradually from one into the other, *Calycantheæ*, p. 22
Carpels on a conical torus. Climbing shrubs with large simple leaves and inconspicuous unisexual flowers . . *Menispermaceæ*, p. 27
** Carpels consolidated.
Placentas parietal.
Stamens tetradynamous (6, 2 shorter than the others). Herbs; sepals 4, petals 4 *Cruciferæ*, p. 43
Stamens not tetradynamous.
Stamens indefinite. Hypogynous disk large. Shrubs *Capparideæ*, p. 53
Stamens definite. Hypogynous disk large. Herbs having inconspicuous fragrant flowers and an open capsule, *Resedaceæ*, p. 54
Stamens indefinite. Hypogynous disk very small or absent. Herbs with a coloured juice and showy flowers; petals often crumpled; sepals very fugacious *Papavereæ*, p. 36
Stamens definite. Trailing herbs with very small leaves and small pink flowers *Frankeniaceæ*, p. 61
Placentas covering the dissepiments. Water plants *Nymphæaceæ*, p. 34

Placentas axile.
Styles distinct to the base.
Calyx in a broken whorl, much imbricated.
Stamens polyadelphous. Shrubs or herbs having opposite, usually dotted leaves, and yellow flowers *Hypericineæ*, page 76
Stamens monadelphous or free.
Calyx slightly imbricated, sepals in a complete whorl.
Each carpel with an hypogynous scale at its base. Succulent herbs with cymose flowers . *Crassulaceæ*, p. 188
Carpels without hypogynous scales.
Carpels two, diverging at the top . *Saxifrageæ*, p. 178
Carpels not diverging at the top. Herbs with opposite leaves and usually dichotomously cymose flowers *Caryophylleæ*, p. 62
Styles more or less combined, gynobasic.
Trees with deciduous unequally pinnate leaves and inconspicuous flowers *Ailanthus*, p. 98
Styles wholly combined.
Herbs, shrubs, or trees, usually having glandular cysts containing pungent juice, and hermaphrodite flowers *Rutaceæ*, p. 95
Shrubs or trees with diœcious or polygamous flowers *Ptelea* and *Skimmia*, p. 96-97
Styles divided at the top. Flowers irregular. Herbs, *Impatiens*, p. 94
Styles more or less combined, not gynobasic.
Calyx much imbricated; sepals in a broken whorl.
Flowers unsymmetrical.
Flowers regular.
Petals without appendages. Trees or shrubs with opposite deciduous leaves, polygamous often apetalous flowers, and a samaroid fruit *Acerineæ*, p. 107
Petals with or without appendages. Trees with compound deciduous leaves and showy flowers *Sapindeæ*, p. 104
Flowers papilionaceous (Pea-like). Herbs or undershrubs with simple leaves; stamens united *Polygaleæ*, p. 61
Calyx only slightly imbricated, in a complete whorl.
Carpels four or more. Anthers opening by pores. Evergreen or deciduous shrubs with small flowers *Ericaceæ*, p. 274
Carpels four or more. Anthers opening by slits.
Stamens united in a long tube. Trees with pinnate leaves and numerous small paniculate flowers, *Meliaceæ*, p. 98
Stamens free or nearly so. Shrubs with alternate leaves having a winged jointed petiole and fragrant flowers *Citrus*, p. 97
Carpels fewer than four.
Flowers hermaphrodite.

Sepals two. Herbs . . . *Portulaceæ*, page 74
Sepals more than two.
Stamens hypogynous.
Seeds plumose. Shrubs with minute imbricated persistent leaves and small spicate flowers . . . *Tamariscineæ*, p. 75
Seeds naked. Shrubs or trees with alternate leaves and inconspicuous flowers *Pittosporeæ*, p. 60
Stamens perigynous. Shrubs or trees with evergreen or deciduous simple leaves and inconspicuous flowers . *Celastrineæ*, p. 100
Calyx valvate or open.
Stamens if equal in number to the petals, opposite to them. Shrubs with inconspicuous flowers *Rhamneæ*, p. 101
Stamens if equal in number to the petals, alternate with them. Herbs having a tubular often coloured calyx and perigynous stamens *Lythrarieæ*, p. 195

2. Flowers apetalous.

A. Flowers destitute of both calyx and corolla.

† Leaves stipulate.

Ovules numerous. Seeds plumose. Deciduous trees and shrubs with alternate deciduous simple leaves and dioecious flowers arranged in catkins *Salicineæ*, p. 416

Ovules solitary or very few.

Flowers unisexual.

Carpels solitary. Ovule erect. Deciduous shrubs covered with resinous glands. Flowers in catkins *Myricaceæ*, p. 413

Carpels solitary. Ovule pendulous. Deciduous trees with large palmately-lobed leaves. Flowers in dense spherical heads *Platanaceæ*, p. 405

Carpels three. Shrubs or herbs with small clustered often involucrate flowers *Euphorbiaceæ*, p. 399

†† Leaves exstipulate.

Shrubs with hermaphrodite spicate flowers, simple leaves, and jointed stems *Piperaceæ*, p. 399

Shrubs or trees with small clustered flowers and opposite leaves *Oleaceæ*, p. 291

Shrubs with simple deciduous leaves, usually covered with resinous vesicles *Myricaceæ*, p. 413

B. Flowers with only one envelope, termed perianth or calyx.

§ Ovary inferior or partially so.

† Leaves stipulate.

Flowers hermaphrodite. Herbs or climbing shrubs with simple leaves and an irregular or regular campanulate or tubular perianth *Aristolochiaceæ*, p. 397

Flowers unisexual. Fruit in a cupule or involucre. Deciduous or evergreen trees or shrubs with alternate leaves and flowers usually in catkins . . . *Cupuliferæ*, p. 408

Flowers unisexual. Fruit naked, many-seeded, usually winged. Herbs *Begoniaceæ*, p. 207

†† Leaves exstipulate.

Flowers unisexual, amentaceous.

Leaves simple, alternate, usually furnished with resinous glands *Myricaceæ*, page 413
Leaves simple, opposite. Evergreen shrub . . *Garrya*, p. 217
Leaves compound. Deciduous trees, often having a balsamic juice *Juglandaceæ*, p. 406
Flowers unisexual, not amentaceous. Tender herbs having ornamental fruits *Cucurbitaceæ*, p. 206
Flowers hermaphrodite or polygamous.
Leaves with transparent dots. Evergreen shrubs or trees with numerous stamens . . . *Myrtaceæ*, p. 193
Leaves without dots.
Ovary 3- to 6-celled, many-seeded. Herbs or climbing shrubs with an irregular or campanulate perianth *Aristolochiaceæ*, p. 397
Ovary 1-celled, 1-seeded. Herbs or shrubs usually having scaly leaves *Chenopodiaceæ*, p. 388

§§ Ovary superior.
† Leaves stipulate.
Flowers hermaphrodite.
Carpels more than one, combined into a solid pistil.
Perianth coloured, valvate; stamens monadelphous, hypogynous. A shrub *Fremontia*, p. 84
Perianth membranous. Fruit winged or drupaceous. Trees with simple alternate deciduous leaves . . *Ulmaceæ*, p. 403
Carpels solitary or quite separate.
Styles terminal, three to each ovary.
Herbs with sheathing, often fringed stipules *Polygonaceæ*, p. 383
Herbs with simple stipules . . . *Phytolaccaceæ*, p. 387
Flowers unisexual.
Carpels more than one, combined into a solid pistil.
Flowers amentaceous. Deciduous trees with simple leaves *Betulaceæ*, p. 414
Flowers not amentaceous . . . *Euphorbiaceæ*, p. 399
Carpels solitary.
Herbs with lobed leaves and exalbuminous seeds *Cannabinaceæ*, p. 403
Trees or shrubs with large stipules . . . *Moraceæ*, p. 401

†† Leaves exstipulate.
Flowers hermaphrodite.
Carpels more than one, combined into a solid pistil.
Perianth short, herbaceous.
Embryo curved round mealy albumen. Herbs or shrubs *Phytolaccaceæ*, p. 387
Perianth tubular, coloured. Herbs or undershrubs *Lythrariæ*, p. 195
Carpels solitary or quite separate.
Carpels several. Stamens hypogynous. Herbs or climbing shrubs with petaloid sepals and very small deformed petals or none . . . *Ranunculaceæ*, p. 1
Carpel solitary.
Anthers with recurved valves. Evergreen or deciduous trees or shrubs *Lauraceæ*, p. 392
Perianth tubular, coloured, hardened at the base. Herbs *Nyctaginaceæ*, p. 385

Perianth tubular, usually coloured, not hardened at the base.
Stamens borne on the segments of the perianth.
Shrubs and trees . . . *Proteaceæ*, page 395
Stamens not borne on the segments of the perianth.
Ovules erect. Evergreen or deciduous shrubs or trees with lepidote leaves . *Elæagnaceæ*, p. 395
Ovules pendulous. Shrubs with a tough fibrous bark *Thymelaceæ*, p. 393
Perianth short, not tubular or only slightly so.
Leaves lepidote. Shrubs . . . *Elæagnaceæ*, p. 395
Leaves not lepidote.
Perianth dry and coloured. Herbs *Amaranthaceæ*, p. 388
Perianth herbaceous or succulent *Chenopodiaceæ*, p. 388
Flowers unisexual. Herbs or shrubs with scaly simple leaves and a membranous or baccate 1-seeded fruit . *Chenopodiaceæ*, p. 388

3. Flowers with both calyx and corolla, the latter monopetalous.[1]

§ Ovary superior. Flowers regular.
* Ovary 3- to 5-lobed.
Leaves usually scabrid. Inflorescence gyrate. Herbs or undershrubs *Borraginaceæ*, p. 319
Leaves not scabrid. Inflorescence straight. Corolla plaited in æstivation. Trailing annuals with showy flowers resembling those of Convolvulus *Nolanaceæ*, p. 318
** Ovary not lobed.
Anthers opening by pores. Evergreen or deciduous shrubs with conspicuous flowers *Ericeæ*, p. 275
Anthers opening by slits.
Carpels 4 or 5 or only 1.
Stamens equal in number and opposite to the petals. Herbs *Primulaceæ*, p. 371
Stamens not opposite the petals if of the same number.
Carpels distinct; seeds indefinite. Succulent herbs *Crassulaceæ*, p. 188
Carpels combined.
Æstivation of corolla plicate. Climbing, twining, or trailing herbs with brightly coloured flowers *Convolvulaceæ*, p. 315
Æstivation of corolla imbricated. Shrubs often with prickly evergreen leaves and small flowers *Ilicineæ*, p. 99
Carpels usually three.
Inflorescence gyrate. Herbs . . *Hydrophyllaceæ*, p. 314
Inflorescence not gyrate. Herbs or shrubs *Polemoniaceæ*, p. 305
Carpels only two.
Stamens two.
Corolla valvate. Erect shrubs or trees . . *Oleaceæ*, p. 291
Corolla imbricate. More or less trailing or climbing shrubs with white or yellow flowers . . *Jasmineæ*, p. 289
Stamens four or more.
Inflorescence gyrate. Herbs *Hydrophyllaceæ*, p. 314

[1] In some instances the petals are only very slightly united at the base.

Inflorescence straight.
Calyx in a broken whorl. Trailing or climbing herbs, *Convolvulaceæ*, page 315
Calyx in a complete whorl.
Flowers symmetrical. Seeds usually kidney-shaped and pitted. Herbs or shrubs . *Solanaceæ*, p. 326
Anthers and stigmas consolidated. Seeds usually plumose. Herbs or shrubs . *Asclepiadeæ*, p. 300
Anthers free from the stigma.
Corolla imbricated. Herbs with showy flowers and usually ribbed leaves . *Gentianaceæ*, p. 302
Corolla valvate or convolute. Herbs with flowers in one-sided spikes . . . *Spigelia*, p. 302
Corolla contorted, Seeds usually plumose. Shrubs or trailing herbs. Stigma constricted in the middle *Apocyneæ*, p. 297
Flowers unsymmetrical. Leaves opposite, exstipulate. Flowers spicate or capitate, tetramerous. Shrubs *Buddlea*, p. 347
Carpel single. Styles 5. Herbs or undershrubs *Plumbaginaceæ*, p. 380
§§ Ovary superior. Flowers irregular.
* Ovary 4-lobed; lobes 1-seeded. Herbs or shrubs with opposite leaves usually furnished with immersed glands of aromatic fragrant oil *Labiatæ*, p. 360
** Ovary undivided.
Carpels two.
Fruit nucamentaceous, 2- or 4-celled. Herbs or shrubs *Verbenaceæ*, p. 357
Fruit capsular or succulent.
Placentas parietal.
Annual herbs. Seeds not winged. Fruit terminated by a curved beak *Martynia*, p. 354
Shrubs or herbs of trailing, twining, or climbing habit. Fruit not beaked; seeds winged . *Bignoniaceæ*, p. 351
Placentas axile,
Seeds albuminous. Herbs, shrubs, or trees with showy flowers *Scrophularineæ*, p. 333
Seeds exalbuminous.
Seeds winged. Shrubs or herbs of climbing or trailing habit and showy flowers . . . *Bignoniaceæ*, p. 351
Seeds wingless, attached to hardy woody placentas. Herbs with elegant bipinnatifid leaves and leafy spikes of dull-coloured flowers . *Acanthus*, p. 355
Placenta free, central. Stamens two. Aquatic or marsh herbs *Lentibularineæ*, p. 370
§§§ Ovary inferior.
* Carpels solitary.
Anthers syngenesious (united with the pistil). Herbs or shrubs; flowers (florets) collected in involucrate heads. Ovary usually surmounted by a scaly bristly or plumose calyx (pappus) *Compositæ*, p. 229
Anthers free.

Carpel quite solitary. Flowers in bracteate heads *Dipsaceæ*, page 227
Carpel with two abortive ones. Flowers not in bracteate heads *Valerianaceæ*, p. 226

** Carpels more than one.
Anthers syngenesious. Herbs with spicate or axillary irregular flowers *Campanulaceæ* (*Lobelia*), p. 272
Anthers free.
Anthers opening by pores. Shrubs . . *Vaccinieæ*, p. 274
Anthers opening by slits.
Herbs with blue or white usually bell-shaped flowers *Campanulaceæ*, p. 268
Shrubs or trees with alternate exstipulate simple leaves and small flowers *Ebenaceæ*, p. 288
Herbs with angular stems, whorled leaves, and cymose flowers *Stellatæ*, p. 225
Shrubs with opposite leaves and showy usually fragrant flowers *Caprifoliaceæ*, p. 218

Sub-class II. MONOCOTYLEDONS or ENDOGENS, p. 458.

A. Flowers having a distinct, usually coloured perianth.
§ Ovary inferior.
* Flowers gynandrous (anthers and stigmas consolidated).
Tuberous or fibrous-rooted terrestrial or epiphytal herbs with very irregular flowers *Orchidaceæ*, p. 466
** Flowers not gynandrous (stamens free).
Leaves cordate, net-veined and ribbed. Flowers unisexual, inconspicuous. Climbing herb . . . *Tamus*, p. 533
Leaves usually broad, veins diverging from the midrib.
Anther one, 1-celled. Leaves 1–3 feet long *Marantaceæ*, p. 467
Anthers five or more. Leaves very large . . *Musaceæ*, p. 467
Leaves usually long and narrow, veins parallel with midrib.
Stamens three.
Herbs with bulbous or rhizomatous roots, and for the greater part with ensiform leaves . . *Iridaceæ*, p. 469
Stamens six.
Leaves flat.
Fruit 3-celled. Outer perianth-segments petaloid.
Herbs with bulbous or fibrous roots, with an umbellate or paniculate inflorescence or solitary flower *Amaryllideæ*, p. 480
Fruit 3-celled. Outer perianth-segments sepaloid, *Bromeliaceæ*, p. 469
Stamens more than six. Aquatic herbs . *Hydrocharidaceæ*, p. 463
§§ Ovary superior.
Outer perianth-segments sepaloid or glumaceous.
Carpels consolidated.
Outer perianth-segments quite distinct from the inner.
Placentas axile.
Herbs with net-veined verticillate leaves and white or violet flowers *Trillium*, p. 531

Herbs with parallel-veined leaves and umbellate flowers
Commelynaceæ, page 536

Placentas parietal.

Shrubs with linear net-veined leaves . . *Philesia*, p. 532

Perianth-segments similar.

Flowers scattered, inconspicuous. Leaves flat or fistular,
Juncaceæ, p. 537

Flowers on a spadix. Leaves usually broad with reticulated veins *Aroideæ*, p. 461

Flowers usually umbellate. Leaves broad, net-veined and ribbed. Shrubs *Smilacineæ*, p. 532

Outer perianth-segments petaloid.

Carpels more or less distinct.

Placentas spread over the dissepiments. An aquatic with long triquetrous leaves and umbellate flowers elevated upon a long stalk *Butomus*, p. 465

Placentas narrow. An aquatic with sagittate leaves and elongated inflorescence *Sagittaria*, p. 464

Carpels combined into a solid pistil.

Placentas parietal. A climbing shrub with 5-nerved ovate leaves and showy flowers *Lapageria*, p. 532

Placentas axile.

Petals rolled inwards after flowering. Aquatic herbs with cordate or oblong leaves and small blue flowers
Pontederaceæ, p. 535

Petals not rolled inwards after flowering.

Anthers turned outwards. Capsule usually dehiscing septicidally. Crocus-like plants or with broad conspicuously-nerved leaves and paniculate flowers,
Melanthaceæ, p. 533

Anthers turned inwards. Fruit when capsular dehiscing loculicidally. Herbs of very dissimilar habit and inflorescence, rarely shrubs . . . *Liliaceæ*, p. 494

B. Flowers without a distinct perianth.

§ Flowers glumaceous.

Tufted herbs with linear leaves, with a split sheath and hollow terete flower-stems *Gramineæ*, p. 538

Tufted herbs with linear leaves, sheath not split, and usually angular solid flower-stems *Cyperaceæ*, p. 537

§§ Flowers naked or with a few bristles or hairs, and arranged on a spadix.

Fruit baccate. Spadix usually more or less enveloped in a spathe,
Aroideæ, p. 461

Fruit dry. Spadix naked, or spathe reduced to a bract *Typhaceæ*, p. 464

GLOSSARY OF TERMS.

In addition to most of the terms employed in describing the plants in this work, we include the principal specific names, with their significations, for the use of those who have not studied Latin. Compound words have been omitted in cases where the meaning can be ascertained by reference to their component parts. Adjectives and nouns of the same derivation, are not always both given, as one is usually sufficient to explain the other. It is almost unnecessary to observe, that the differences in the termination of the same word distinguish the gender, in agreement with that of the generic names.

a, as a prefix, denotes absence of an organ or organs, e.g. *apetalous, acaulescent, acotyledonous.*

Abnormal.—Differing from the usual growth or structure.

Acerosus.—Needle-shaped.

Achene.—A dry 1-seeded indehiscent fruit.

Aculeatus.—Armed with prickles.

Acuminate. — Having an elongated tapering point.

Acute.—Sharp-pointed.

Adelphia.—A brotherhood. Stamens are monadelphous, diadelphous, or polyadelphous, according as they are arranged in one, two, or several fascicles.

Adnate.—One organ consolidated or united to another, as an ovary adnate to the calyx-tube.

Æstivalis.—Produced in Summer.

Æstivation.—The disposition of the parts of a flower before expansion.

Aggregate.—Several bodies or organs in close juxtaposition.

Alate.—Winged, as the stem or seed.

Albus.—White.

Albumen. — The substance found in many seeds with the embryo, sometimes entirely wanting, sometimes constituting the greater bulk of the seed.

Albuminous.—Furnished with albumen.

Alburnum. — The sap-wood or outer rings of exogenous trees.

Alternate. — One above the other in different lines, as the leaves of many plants, or between other organs, as the stamens in respect to petals, etc.

Amentum. — A catkin. *Amentaceous*, plants having the flowers in catkins, like the Willow and Hazel.

Androecium.—The male organs, collectively.

Angios. — Covered. *Angiospermous*, having the seed enclosed in an ovary.

Annual.—Flowering the first season, and of one year or season's duration.

Anther.—That part of the male organ containing the pollen or impregnating substance.

Apetalous.—Destitute of petals,

Apiculate. — Terminating in a short sharp point.

Apocarpous. — Carpels separate from each other.

Arbor.—A tree, a plant with a distinct stem and branches.

Arenarius.—Growing in sandy soil.

Argenteus.—Silvery.

Aristatus.—Awned or bearded.

Articulatus.—Jointed.

Arvensis. — Growing in cultivated grounds.

Asper.—Furnished with harsh hairs.

Ater.—Deep black.

Atratus.—Becoming black.

Attenuatus.—Tapering, slender.

Auratus.—Golden yellow.

Awn.—A stiff or flexible bristle.

Auriculatus. — Provided with ear-like lobes or processes.

Axis.—The stem and root of a plant.

Axil.—The angle formed between the leaf and stem, or between other organs.

Axile.—Proceeding from the centre or axis.

Axillary.—Produced in the axils of the leaves or other organs.

Azureus.—Sky-blue.

Baccate.—Having a more or less succulent or pulpy seed-vessel or berry.

Barbatus. — Bearded, having tufts of soft hairs.

Bi, in compounds, signifies *twice.*

Blade.—The lamina or flat part of a leaf.

Bracts.—The foliaceous appendages of a plant between the normal leaves and the floral envelopes.

Bracteatus.—Furnished with bracts.

Bulb.—A leaf-bud, with fleshy scales, which perpetuates and propagates an individual.

Bulb, naked.—Having loose scales like the Lilies.

Bulb, solid.—See *Corm.*

Bulb, tunicated. — Having the outer scales membranous, e.g. Tulip.

Bullatus.—Blistered or puffed up.

Caducous.—Dropping off.

Cæruleus.—Pale blue.

Cæsius.—Ash-grey.

Calyx. — The outer floral envelope (where there are two), composed of separate or connate sepals.

Campestris.—Growing in fields.

Candidus.—Pure white.

Canescens.—Greyish white.

Capitate.—Terminating in a knob, as the pistil of many plants; or clustered, as the florets of the Compositæ.

Capitulum or *Capitule.*—A dense head of flowers.

Capsule.—A dry dehiscent seed-vessel.

Carneus.—Flesh-colour.

Carpel.—One of the rolled-up leaves forming the gynæcium or pistil, whether separate or combined.

Cartilaginous.—Tough and hard.

Catkin.—A deciduous spike of flowers.

Cauline. — Belonging to or produced from the stem.

Centrifugal.— Applied to those forms of inflorescence whose terminal or central flowers expand first.

Centripetal.—Flowering from the base or circumference towards the centre or tip.

Cernuus.—Drooping, pendent.

Chryso, in compounds, signifies *golden yellow.*

Ciliate.—Having marginal hairs.

Circinate. — Rolled up, like the young fronds of many Ferns.

Clavatus.—Club-shaped.

Claw.—The narrowed stalk-like portion of a petal, as in most Cruciferæ.

Coccineus.—Scarlet or carmine tinged with yellow.

Comose.—Furnished with hairs at the end, as some seeds.

Compound. — Of several parts, as a paniculate inflorescence or pinnate leaf.

Connate.—Parts of the same whorl grown together, as sepals.

Connective.—The rib or part between the anther-cells.

Contorted.—In æstivation, when one edge of a petal or sepal is covered and the other free or exposed; twisted.

Convolute.—In æstivation or vernation,

when one part is rolled up within another.

Cordate.—Heart shaped in outline.

Coriaceous.—Leathery in texture.

Corm. — A fleshy solid underground bulb-like stem.

Corolla.—The second floral whorl of a complete flower between the calyx and stamens, whose separate parts are termed petals.

Corymb.—A raceme, having the pedicels gradually shorter towards the top or centre.

Costate.—Ribbed.

Crassus.—Thick and fleshy.

Crenate.—Having rounded teeth.

Crinitus. — Furnished with tufts of hairs.

Cucullate.—Hood-shaped.

Cuneate.—Wedge-shaped.

Cuspidate.—Having a rigid hard point.

Cyme.—An irregular umbellate inflorescence, as in Laurustinus.

Dealbatus.— Covered with a greyish-white powder.

Deca, in compounds, signifies *ten*.

Deciduous.—Falling off, as the leaves of a large class of trees and shrubs in autumn, or the sepals and petals of most flowers after expansion.

Declinate.—Bent downwards.

Decompound.—Having many divisions.

Decumbent. — Applied to plants with trailing barren and ascending flower stems.

Decurrent.—Continued downwards, as the blade of the leaves of some plants, forming a wing-like appendage to the stem.

Decussate.—Applied to leaves arranged in alternating pairs, forming four lines.

Deflexed.—Turned downwards.

Dehiscence.—The bursting or splitting of the seed-vessel.

Dentate.—Toothed, having triangular teeth. *Dentate - crenate*, having rounded, pointed teeth. *Dentate-serrate*, having tapering sharp-pointed teeth projecting or curved towards the tip of a leaf like the teeth of a saw.

Di, in compounds, signifies *two*.

Diadelphous.—Stamens in two bundles or fascicles.

Dichlamydeous. — Having both calyx and corolla.

Diclinous. — Unisexual, stamens and pistils in different flowers.

Dicotyledonous. — Having two seed-leaves.

Didynamous. — Having four stamens, two shorter than the others.

Digitate.—Divided into distinct lobes in a radiate manner, as the leaves of Lupinus polyphyllus and Horse-Chestnut.

Dimidiate.—The two halves of an organ very unequal in size.

Dioecious.—Bearing the sexes on different individuals.

Discolor.—Applied to leaves differing in the colour of the upper and lower surfaces, or with an admixture of any other colour and green.

Disk.—Applied to the organ or organs between the stamens and ovary, usually consisting of scales or a fleshy ring.

Dissected.—Deeply divided into many narrow lobes.

Dissepiments. — The partitions of an ovary or fruit.

Distichous.—Arranged in two opposite rows.

Dorsal.—Appertaining to the back.

Drupe.—A fleshy fruit having a hard putamen or endocarp, as the Cherry.

Dulcis.—Sweet, agreeable.

Duramen.—The heartwood or centre of Exogenous trees, and the outer part of the stem of Endogens.

e, ex, in compounds, denotes absence, as *ebracteate, eglandular, exalbuminous.*

Echinate.—Clothed with bristles, like the fruit of the Sweet Chestnut.

Emarginate.—Notched at the tip.

Embryo.—The germ of a plant in the seed.

Ensiform.—Sword-shaped, as the leaves of Iris.

Entire.—Having an unbroken or undivided margin.

Epi, in compounds, signifies *upon*.

Epidermis.—The skin of a plant immediately underlying the cuticle.

Equitant. — Applied to leaves whose edges adhere above the base, where they overlap the one next above on the opposite side of the stem, as in Iris Germanica, etc.

Evergreen.—Bearing green leaves all through the year.

Ex, in composition, signifies *without*, as exalbuminous; or outside, external, as exogenous.

Exogenous.—Growing by additions to the circumference.

Exserted.—Projecting beyond, as stamens exceeding the corolla.

Extrorse.—Applied to anthers which open outwards or from the pistil.

Falcate. — Curved in the form of a sickle.

Fastigiate.—Applied to the branches of a tree when they are erect and close, as in the Upright Cypress and Lombardy Poplar.

Fascicled. — Several organs growing from one point, as leaves, flowers, or roots.

Feathery.—Applied to the soft hairy pappus of many Composites, plumose.

Filament.—The lower portion or stalk of a stamen, bearing the anther.

Filiform.—Thread-like, slender.

Fimbriate.—Fringed at the margin.

Fistular.—Applied to the hollow stems and leaves of plants.

Flavus.—Pale yellow.

Florets. — Applied to the separate flowers of Compositæ and similar plants.

Fluitans.—Floating.

Fluviatilis.—Aquatic.

Folium.—A leaf. Plural, *Folia*.

Free.—Separate, not joined together or with any other organs.

Frond.—Applied to the leaves of Ferns and Palms.

Fruit.—The seed-vessel with its appendages.

Frutex (*Frutescent*). — A shrub; a woody plant destitute of a trunk, and branching from the base, or nearly so.

Fugacious.—Falling very early, as the sepals of the Poppies and the petals of Cistus.

Fulvus.—Dull yellow, buff.

Fuscus.—Brownish.

Glabrous.—Having no hairs, smooth.

Glaucous.—Sea-green.

Graveolens. — Possessing an intense odour.

Gymnos, in compounds, signifies *naked*.

Gynœcium.—The female organs collectively.

Gynandrous.—Stamens and styles consolidated.

Herbaceous.—Applied to all green parts and annual stems.

Hermaphrodite. — Applied to flowers containing both male and female organs.

Hirsutus.—With long soft hairs.

Hispid.—Having long stiff hairs.

Humilis.—Dwarf, used in comparison.

Hypo, in compounds, signifies *under*, as hypogynous stamens, below the pistil.

Igneus.—Bright scarlet.

Imberbis.—Destitute of hairs.

Imbricate.—Applied to leaves or to the parts of a flower when they overlap each other.

Imparipinnate. — Unequally pinnate, having an odd terminal leaflet.

Incomplete. — Some part wanting, as calyx, corolla, etc.

Indusium.—The membranous covering of the spore-cases of many Ferns.

Inferior.—Applied to an ovary when the calyx-tube is adnate to it, and to the calyx when it is quite free from the ovary and below it.

Introrse. — Anthers opening inwards, towards the axis, are introrse.

Involucre.—The name given to one or more series of bracts surrounding a head of flowers, etc.

Irregular.—Petals or sepals unequal in size or different in form in the same flower.

Jugum.—Applied to a pair of leaflets; thus a leaf may be *unijugate, bijugate* or *multijugate,* according as there are one, two, or many pairs of leaflets.

Keel.—The name given to the lower pair of petals of Papilionaceous flowers.

Labiate, lipped, as the flowers of many Labiatæ, etc.

Lacteus.—White with a faint tinge of blue.

Lacustris.—Growing in lakes.

Lamina.—The blade of a leaf.

Lanceolate.—In the form of a lance-head, tapering to both ends.

Legume.—A name given to the seed-vessel of the Pea family, opening in two valves and having the seeds attached to the ventral suture.

Linear.—Narrow with parallel edges.

Littoralis.—Growing on the sea-shore.

Loculicidal (dehiscence). — Splitting down the back between the divisions.

Lucidus.—Shining.

Luteus.—Yellow.

Macros, in composition, long, large.

Mono, in compounds, signifies *one.*

Monocarpic.—Flowering and fruiting only once.

Monocotyledonous.—Having one seed-leaf.

Monœcious.—Sexes in separate flowers on the same individual.

Mucronate. — Terminating in a short hard point.

Multi, in compounds, signifies *many.*

Mutabilis.—Changeable.

Niger.—Black.

Nitidus.—Smooth and shining.

Nivalis.—From snowy regions.

Niveus.—Snowy white.

Nudus.—Naked.

Nutans.—Drooping, nodding.

Ob.—A prefix denoting inversion: *obcordate, obovate,* etc.

Obtuse.—Rounded or blunt.

odes, oides.—A termination denoting similarity, resemblance.

Orbicular.—Circular.

Ovate.—Egg-shaped in outline.

Ovary.—Applied to the young state of the seed-vessel.

Ovule.—The young seed.

Paleaceous. — Furnished with chaffy scales, as the receptacle of some Composites.

Palmate.—Lobed in the form of a hand.

Paludosus } Growing in marshy places.
Palustris }

Panicle.—A compound raceme.

Papilionaceous.—Butterfly-flowered, like the Pea.

Pappus. — The calyx of Composites, varying from a ring of membranous scales, to bristles or hairs.

Parietal (placentation).—On the sides or walls of the carpels.

Patens.—Spreading.

Pedate.—A modification of the palmate leaf, whose lower lobes are again divided and directed downwards.

Pedicel.—The secondary stalks of a compound inflorescence, bearing individual flowers.

Peduncle.—The main stalk of a compound inflorescence, or the stalk of a solitary flower.

Peltate.—Attached by the middle.

Perennial.—Of three or more years' duration, and polycarpic.

Perianth. — Applied to the floral envelope of Endogens and Monochlamydeous Exogens.

Pericarp.—The shell or rind of a fruit.

Perigynous.—Growing upon the throat of the calyx around or above the ovary.

Persistent.—Remaining green until the fruit is ripe, as the calyx of many plants; also applied to the leaves of evergreens.

Personate.—A gamopetalous corolla in the way of Antirrhinum.

Petals.—The separate parts of a polypetalous corolla.

Petaloid.—Resembling petals in colour, etc.

Petiole.—A leaf-stalk.

Petiolate.—Having a leaf-stalk.

Phænogamous. — Having manifest flowers.

Phyllum, in composition, a leaf.

Pinnate.—A compound leaf having a single row of leaflets on each side of the petiole.

Pinnatifid. — A simple leaf divided nearly to the midrib, that is to say, almost pinnate.

Pinnules.—The primary divisions of a pinnate frond.

Pistil.—The female organs of a flower, collectively: ovary, style, and stigma.

Placenta.—The process or body which bears the ovules.

Plaited (*plicate*).—Folded in the manner of a closed fan.

Plumose.—Feathery.

Plumule.—The first or embryonic bud.

Pollen.—The powdery substance contained in the anthers, which serves to fertilize the ovules.

Polycarpic.—Fruiting more than once.

Polygamous.—A term applied to those plants having male, female, and hermaphrodite flowers intermixed on the same individual.

Præcox.—Flowering early.

Pratensis.—Growing in meadows.

Procumbent.—Lying on the ground.

Pulverulentus.—Covered with a powdery substance.

Pumilus.—Short and dense in habit.

Putamen.—The hard part or shell of stone-fruit, like the Almond.

Raceme.—A kind of inflorescence in which the pedicellate flowers are arranged singly on a common peduncle. Ex. Ribes, Wallflower.

Rachis.—The divisions of the petiole of a frond.

Radical.—Proceeding from the root.

Radicle.—The first root of a young plant.

Ramosus.—Much-branched.

Receptacle.—The part bearing the florets in the Compositæ, or the parts of the flower of any plant; but *torus* is the word now generally employed to designate the latter.

Reflexed.—Turned backwards.

Regular.—All the parts of each series of a flower alike.

Reniform.—Kidney-shaped in outline.

Repens.—Creeping.

Reticulate.—Net-veined.

Rhizome. — A creeping underground stem.

Riparius.—Growing on the banks of streams or lakes.

Rosulate.—Disposed in the form of a rosette.

Rotate.—In the form of a wheel.

Ruber.—Red of any tint.

Ruderalis.—Growing amongst rubbish.

Rugose.—Wrinkled.

Rupestris.—Growing on rocks.

Sabulosus.—Growing in sandy places.

Sagittate.—Shaped in the form of an arrow-head.

Samara.—Applied to such winged indehiscent fruits as the Sycamore.

Saxatilis.—Growing on rocks or stones.

Scaber, scabrid.—Rough to the touch.

Scandens.—Climbing.

Scape. — A radical, usually naked flower-stalk.

Scarious.—Thin, dry and membranous.

Scorpioid.—Rolled up, as the inflorescence of many Borragineæ.

Secund.—Having all the flowers or leaves turned in the same direction.

Semi, as a prefix, denotes *half*, *partial*, or *one-sided*.

Sempervirens.—Evergreen.

Septum.—The partition of an ovary or fruit.

Septicidal (*dehiscence*). — Separating through the dissepiments.

Sericeus.—Silky.

Serotinus.—Late.

Serrate.—Saw-toothed.

Sessile.—Stalkless.

Setaceus.—Bristly.

Sinuate.—Having an uneven wavy margin.

Sinus.—The recesses of a lobed organ.

Spadix. — A flower-spike usually enclosed in a spathe.

Spathe.—A large leafy bract enclosing the inflorescence of most of the Aroideæ.

Spathulate. — Oblong, tapering downwards in a long narrow stalk.

Spike.—Having sessile flowers on a long axis.

Squamatus.—Clothed with scales.

Stamen.—The male organ of a flower.

Staminode.—Rudimentary organs next to the stamens.

Stigma.—The viscous part of a style to which the pollen adheres.

Stipes.—The main stalk of Fern fronds.

Stipitate.—Stalked, applied to carpels.

Stipules.—Bract-like or spinescent processes at the base of the petioles of many plants.

Stolon.—An offset or runner producing roots at intervals.

Style.—The slender termination of a carpel bearing the stigma.

Sub, in composition, is equal to *somewhat, in some degree.*

Subulate.—Awl-shaped.

Sulcate.—Furrowed.

Superior.—As an ovary when the calyx is below it.

Sylvestris, sylvaticus. — Inhabiting woods.

Syn, signifies union or growing together, as *syncarpous*, when the carpels are consolidated; or *syngenesious*, when the anthers are united.

Tenuis.—Slender, thin.

Terete.—Cylindrical.

Testa.—The skin of a seed.

Tetradynamous.—Having six stamens, of which two are shorter than the other four.

Thalamus.—The receptacle or torus of a flower.

Tomentose. — Having a dense short down.

Toothed.—Having small divisions on the margin.

Torus.—The part on which the divisions of a flower or fruit are seated.

Tri, in compounds, signifies *three.*

Trifoliolate.—Having three leaflets proceeding from the same point.

Tristis.—Dull-coloured.

Truncate.—Terminating abruptly, as the leaf of the Tulip-tree.

Tuber.—An underground fleshy stem, like the Dahlia.

Tuberculate. — Covered with excrescences.

Uliginosus.—Inhabiting swampy places.

Umbel.—An inflorescence, having the flower-stalks radiating from one point. An umbel is either simple or compound.

Umbrosus.—Growing in shady places.

Unarmed. — Destitute of spines or prickles.

Undulate.—Having a wavy margin.

Urens.—Stinging.

Valvate (*æstivation*).—Sepals or petals meeting at the margins, but not overlapping each other.

Velutinus.—Velvety, as the surface of leaves.

Ventral.—The anterior part of an organ.

Vernalis.—Produced in Spring.

Vernation.—The arrangement of leaves in bud.

Verrucosus.—Warty.

Versatile.—Affixed by the middle.

Verticillate. — When several leaves, petals, etc., are on the same plane around the axis.

Virens.—Green.

Virgatus.—Twiggy.

Viridis.—Clear full green.

Volubilis.—Twisting.

Whorl.—A ring of organs on the same plane.

Winged.—Furnished with a membranous expansion, as the seeds of many Conifers and the fruits of the Maples.

HANDBOOK

OF

HARDY PLANTS.

PART I.—DESCRIPTIONS OF HARDY PLANTS

SYSTEMATICALLY ARRANGED.

PHÆNOGAMOUS OR FLOWERING PLANTS.

VEGETABLES with manifest staminate and pistillate flowers, and seeds containing a distinct embryo.

SUB-CLASS I.—DICOTYLEDONS OR EXOGENS.

Stem when perennial consisting of a central pith, concentric layers of wood, and a separable bark; and increasing in size by additions between the wood already formed and the bark. Leaves net-veined. Seeds with 2 opposite entire cotyledons, or rarely deeply divided, as in some of the *Coniferæ*. Parts of the flower generally in fours or fives.

DIVISION I.—*POLYPETALÆ.*

Petals, when present, free from the base, or very slightly united.

ORDER I.—RANUNCULÀCEÆ.

Perennial or annual herbs with radical or alternate leaves, rarely climbing shrubs with opposite leaves. Stipules absent, or adnate to the petiole. Flowers regular or irregular. Sepals 5 or more, rarely fewer, deciduous, often petaloid, imbricate or valvate in bud. Petals often undeveloped, or 5 or more, sometimes only 3, frequently minute or deformed. Stamens many, hypogynous; anthers adnate, dehiscing laterally. Carpels

usually numerous, seldom only 1, usually free, 1-celled; style simple; seeds 1 or more on the ventral suture, anatropous, erect with a ventral, or pendulous with a dorsal raphe. Fruit of 1-seeded achenes or many-seeded follicles. A large order dispersed all over the world, not rare in the tropics. Many species are acrid, and some highly poisonous, especially the Aconites.

Tribe I.—*CLEMATÍDEÆ.*

Sepals valvate. Petals none, or narrow and staminoid. Carpels numerous, 1-seeded, indehiscent. Stem herbaceous or woody and climbing. Leaves opposite.

1. CLÉMATIS.

A noble genus of woody or herbaceous climbing plants, with usually opposite, ternate, or pinnate leaves, and twining petioles sometimes transformed into tendrils. Flowers in terminal or axillary panicles, rarely solitary. Sepals normally 4, but often more numerous, especially in the cultivated forms, coloured lilac, violet, or white. Petals none, or very much reduced, and passing gradually into stamens, which are very numerous. Carpels with persistent often beautifully bearded styles, lengthening considerably after the flowers have dropped. The species are numerous, and occur in the warm and temperate regions of the whole world. The name is of Greek origin.

1. *C. Vitálba.* Old Man's Beard, Lady's Bower.—The only native species; very abundant in the South of England in chalky districts. Leaves of 3 or 5 ovate variously toothed or lobed leaflets. Flowers fragrant, greenish white, very numerous, about one inch across, appearing in August, and followed by the feathery carpels.

2. *C. Flámmula.*—A very beautiful species with pinnate leaves and small narrow lanceolate leaflets, and fragrant pure white flowers rather smaller than in the preceding. This is one of the commonest and oldest species in cultivation, and a very elegant plant for covering arbours and walls. A native of the South of Europe, flowering towards the end of Summer. There are several slight varieties of this species.

3. *C. montàna.*—Also an old inhabitant of our gardens, having trifoliolate leaves on a long peduncle; leaflets oval, more or less obtusely 3-lobed, with a few scattered hairs, and white

solitary larger flowers. This species is a native of the South of Europe, and blooms in May, and valuable on that account.

4. *C. Viórna* (fig. 1). Leather Flower.—Flowers campanulate, leathery, of a yellowish white, washed with bright purple on the outside. From North America, flowering in August.

5. *C. Hendersòni.*—A garden form, probably of hybrid origin, with large solitary reddish-violet flowers about 2½ inches across; sepals broadly lanceolate and strongly nerved. A very hardy plant, now replaced by some of the larger-flowered garden hybrids of recent production. A late bloomer. This is sometimes referred to *C. Viticélla.*

6. *C. gravèolens.*—A small climbing undershrub, native of the higher mountains of Chinese Tartary. Leaves pinnately



Fig. 1. Clematis Viorna. (⅛ nat. size.)



Fig. 2. Clematis Viticella. (¼ nat. size.)

3- to 5-foliolate; leaflets narrow, 3-lobed. Flowers solitary, yellow, of medium size. Perfectly hardy.

7. *C. Viticélla* (fig. 2).—One of the best old sorts, and, crossed with *C. lanuginòsa*, one of the parents of most of the gorgeous varieties raised by Mr. Jackman and others. Flowers purple, violet, or rose, single or semi-double, produced throughout the Summer. A native of Spain.

8. *C. alpìna*, syn. *Atrágene alpìna.*—A dwarf climber, 3 or 4 feet high, with triternate hairy leaves and solitary rather large violet-blue flowers. In this the petals are imperfectly developed, passing gradually into stamens, and it is some-

times for that reason separated from *Clématis*. There is a white variety known as *C. Sibírica*. July.

9. *C. integrifòlia.*—Stems dwarf, annual, with simple entire hairy leaves and solitary small blue flowers appearing in July. Native of the Pyrenees and mountains of Spain.

10. *C. flórida.*—A very beautiful Japanese plant, and an old inhabitant of our gardens, greatly modified by long cultivation. The leaves are composed of three or more oval leaflets, and the flowers are among the largest of the old sorts, solitary, single or double, pure white. The variety *Sieböldii* is a very ornamental plant, with white flowers having a purple-violet centre. The varieties of this plant are Summer bloomers and very handsome, but not so hardy as some others.

11. *C. azùrea*, including *C. cærùlea* and *C. pàtens* (fig. 3).—Another Japanese species with ternate or biternate leaves and large solitary widely-expanded flowers 5 to 6 inches in diameter, composed of about 8 sepals in the single varieties. The normal tint is a pale blue or lilac, passing into white in some varieties. Amongst these varieties, *monstròsa* is remarkable for its semi-double flowers; *Amalia* has pale violet sepals, and *Sophia* is another single variety with immensely large and unusually broad sepals of a deep violet, with a longitudinal greenish band through the centre. This species is rather tender.



Fig. 3. Clematis azurea. (¼ nat. size.)

12. *C. lanuginòsa.*—The leaves of this species are relatively large, and usually simple, broadly cordate, acute, glabrous above and hairy beneath. Flowers very large, solitary, formed of 6 or 8 spreading sepals of a palish blue or lilac. There is a variety of this known as *pállida*, with flowers not less than 9 or 10 inches across. A native of China, flowering in June.

13. *C. Fortùnei.*—Like the last, of rather recent introduction, and also a very magnificent plant. Here the leaves are rather coriaceous, and usually 3-foliolate; leaflets cordate, rounded at

the apex. Flowers fragrant, white, about 6 inches across, consisting of about a hundred oblong-lanceolate stalked sepals. This is quite hardy.

Amongst the earlier hybrid varieties raised by Mr. G. Jackman, of Woking, who was, we believe, the first to institute experiments in crossing the species of this genus, we may mention *rùbro-violàcea*, with broadly oval or almost orbicular sepals of a reddish purple; and *Jackmánii*, of a rich violet purple. Owing to the remarkable success of this gentleman, several other horticulturists have followed his example, and the result is that many new varieties are offered every year.

Tribe II.—*ANEMÒNEÆ.*

Sepals imbricate. Carpels 1-seeded, indehiscent; seed pendulous, raphe dorsal. Herbs with radical or alternate leaves.

2. THALÍCTRUM.

Erect graceful perennials. Leaves compound. Flowers small, numerous, in panicles or racemes. Sepals 4 or 5, petaloid. Petals absent. Stamens numerous, with long usually yellow conspicuous anthers projecting beyond the calyx. Carpels several, with one pendulous seed. A classical name of obscure derivation. Species numerous, widely spread.

1. *Th. flàvum.* Meadow Rue.—About 3 feet high. Leaves dark green, much divided, with cuneate segments. A showy plant with bright yellow flowers. A British plant, flowering at Midsummer.

2. *Th. mìnus.*—The typical form of this species is a very elegant little plant, producing its graceful foliage in dense tufts. The flower-stem rises about a foot high, and the flowers are small and greenish white, sometimes tinged with red. Native of North Europe and Asia, including Britain.

3. *Th. anemonoìdes*, syn. *Anemòne thalictroìdes.*—A pretty dwarf species, resembling an *Anemòne*, but destitute of an involucre. In this species the petaloid sepals are more conspicuous than the stamens. The flowers are white, umbellate; stems about a foot high, with a whorl of leaves at the base of the umbel. There is a double variety. North America.

4. *Th. aquilegifòlium.*—A handsome tall-growing species with much-divided glaucous leaves resembling those of the Columbine, and large stem-clasping stipules. There are two

varieties of this, one with purplish stems and flowers. Germany.

3. ANEMÒNE (including *Hepática*).

Perennial herbs. Leaves all radical, variously lobed and dissected. Flowers showy, blue, white, red, purple, or yellow. Scape usually 1-flowered, with a 3-leaved involucre distant or closer under the calyx. Sepals 4 to 10, petaloid. Petals undeveloped. Stamens numerous, outer ones sometimes petaloid. Carpels numerous, 1-seeded; seed pendulous. A large genus, whose species are chiefly confined to the northern hemisphere. A few reach South America and South Africa, and one is found in Australia. The Greek name of one of the species. We may conveniently divide the cultivated species into two sections, though other species not in cultivation connect these two sections.

§ 1. *Involucre close under the sepals having the appearance of a true calyx, especially as the sepals are petaloid.* HEPATICA.

1. *A. Hepática*, syn. *Hepática triloba* (fig. 4).—This familiar little plant with its glossy trilobed leaves and numerous blue



Fig. 4. Anemone Hepatica. (½ nat. size.)

or pink or white single, and blue or pink double flowers, is an almost indispensable adjunct to the flower garden. Found wild in mountainous districts of Central and Southern Europe. Begins to bloom in February.

2. *A. angulòsa.*—A distinct and handsome hardy plant. Like the preceding, it grows in dense tufts, but this is a taller

species with larger sky-blue flowers. Leaves hairy when young, on long petioles, deeply 5-lobed; lobes rounded or acute. Flowers more than an inch in diameter. Scape twice as high as the leaves. A native of Hungary, flowering in March and April.

§ 2. *Involucre distant from the sepals.*

The true *Anemones* may be subdivided into two classes. The first including the species from which the numerous garden varieties have descended, and the second the remaining ornamental species. The florists' varieties are believed to be the offspring of the two next species, and crosses between them.

3. *A. Coronària.*—The Poppy Anemones of our gardens belong to this species. Both this and the next have spreading flowers in the single varieties, and are very similar in general appearance. The foliage of this form or species is of a more



Fig. 5. Anemone Coronaria flore pleno. (⅓ nat. size.)

delicate texture, and the flowers of one uniform colour, or at least without a distinct eye. The varieties, both double (fig. 5) and single, are numerous and beautiful, of various shades of purple, violet, and almost a pure blue, rose, pink, and white. A native of the Levant.

4. *A. hortènsis*, syn. *A. stellàta.*—To this species belong the varieties called Star Anemones. In this the sepals are more distinctly spreading, and the wild form is distinguished by having the centre or eye of the flower of a distinct colour. The flowers are usually of a bright red with a white eye; but the cultivated forms are numerous, and it is supposed that some are hybrids of this and the preceding. In the typical plant, too, the leaves are more coriaceous, with broader lobes than in the foregoing. From the South of Europe, and, like the last, a valuable Spring-flowering plant.

5. *A. fúlgens.*—This is probably no other than a variety of the last, though sufficiently distinct to be kept separate here. It has larger deep crimson flowers with obovate sepals. *A. pavonìna* is an abnormal variety of the same plant, in which the sepals are very narrow and numerous, of a bright scarlet or rosy pink colour. A native of the South of Europe, blooming in April and May.

6. *A. Japónica.*—A very beautiful plant, as the name denotes, from Japan, and much taller than any of the preceding species. It grows from 2 to 3 feet high, with simple stems and large bluntly-lobed leaves. The flowers are large, rose or white, produced towards the end of Summer. A very desirable and effective species. The plant called *Honorine Jaubert* is a form of this.

7. *A. élegans* (fig. 6), syn. *A. hỳbrida.*—Differing from the preceding in its greater stature, larger leaves, and less brightly coloured flowers. Also an Autumn-flowering plant. Possibly the result of a cross between No. 6 and the Himalayan *A. vitifòlia*, or simply a variety of *Japónica.*

8. *A. Pulsatílla* (fig. 7). Pasque-flower.—A very pretty indigenous species with dull purple flowers and long feathery styles. Under cultivation it grows about a foot high, with flowers 2 inches in diameter, sepals usually 6, outer stamens reduced to glands. May.

9. *A. sylvéstris.*—A beautiful pure white-flowered species from Central Europe and Siberia. It has something the habit of No. 6, but is not more than half its size. The flowers are over an inch in diameter, and very profuse in a shady habitat.

10. *A. ranunculoìdes.*—Leaves ternately compound. Sepals 5, bright yellow, hairy outside. Styles not bearded. A handsome plant, allied to the common Wood Anemone. South of Europe. April.

11. *A. nemoròsa.* Wood Anemone.—This familiar inhabitant of our copses and woods should be introduced into shrubberies and parks where it does not exist, being one of the hand-



Fig. 6. Anemone elegans. (½ nat. size.)



Fig. 7. Anemone Pulsatilla. (½ nat. size.)

somest of our native Spring flowers. Sepals 5, glabrous, white or tinged with purple.

12. *A. Apennìna.*—Sepals numerous, bright azure blue. Leaves and involucre ternate. April. This is naturalised in some parts of Britain. *A. blánda* is a near ally of this.

13. *A. palmàta.*—A yellow-flowered species with reniform obtusely lobed leaves and numerous narrow sepals. It grows about 9 inches high, and is a very distinct and beautiful plant. A native of the South of Europe, flowering in May. There is a white and also a double variety of this species.

4. ADÒNIS.

A small genus of annual and perennial plants with compound leaves very finely divided into thread-like segments. Flowers yellow or red. Sepals 5 to 8, petaloid, deciduous. Petals 5 to 16, destitute of glands. Carpels numerous, with 1 pendulous seed in each. The species are limited to the temperate zone

of the northern hemisphere in the Old World. The name is of classic origin.

1. *A. vernàlis.*—A handsome herbaceous perennial, about a foot high. Leaves sessile. Flowers bright yellow, about 2 inches in diameter. Styles hooked. March.

2. *A. æstivàlis.*—An erect almost singled-stemmed annual, with flowers about half the size of the preceding, of a deep crimson, or more rarely orange, with a black spot at the base of the petals. Styles straight.

3. *A. Pyrenàica.*—Rather taller than No. 1, with distinct radical leaves on long stalks, and fewer petals. Flowers yellow. Summer.

Tribe III.—*RANÚNCULEÆ.*

Sepals imbricate. Carpels 1-seeded, indehiscent; seeds ascending, raphe ventral.

5. RANÚNCULUS.

Annual or perennial herbs with entire or dissected leaves, cauline often differing from the radical. Flowers double in some cultivated varieties, usually yellow or white, in terminal panicles, or sessile in the axils of the leaves. Sepals 3 to 5, caducous, imbricated in the bud. Petals usually 5, glandular at the base. Carpels many, with 1 erect seed. From the Latin *rana*, a frog, in allusion to the habitat of many species. A vast genus, dispersed all over the world. This genus, like *Anemòne*, has its florists', or what we might term classical species, and here also there seem to have been two original species, though the second is of less importance.

1. *R. Asiáticus.*—This was introduced into Western Europe towards the end of the sixteenth century, though it had previously been long under cultivation in Asia. It is supposed to be indigenous in Persia; but the first were brought from Constantinople. They were semi-double, but fertile, and thus seed was obtained from which new varieties were raised. They soon gained favour, and rapidly spread, especially in England and Holland, where the principal varieties originated. The Persian Ranunculus (fig. 8) is of smaller stature than the double Anemones, with less finely-cut foliage, and more spreading rose-like petals. Amongst the colours represented are yellow, bright orange, crimson, rose, brown, chestnut, dark purple, and pure white, with all their intermediate shades and

tints. Some varieties are unicoloured, and others are of two or three colours, in stripes, spots, or borderings.



Fig. 8. Ranunculus Asiaticus flore pleno. (½ nat. size.)

2. *R. Africànus.* Turban Ranunculus.—This differs from the foregoing in greater height, broader less narrowly divided leaves, and large more convex flowers, in consequence of the petals being incurved towards the centre of the flower. It is likewise hardier, and blooms earlier, and is not so difficult to grow. The varieties are fewer, and as the flowers are invariably sterile new ones are not produced. They are yellow, orange-red, white, dark brown, &c., unicoloured or variegated. The better known sorts are: *Romano*, scarlet; *Turban d'or*, scarlet and golden-yellow; *Séraphique*, yellow; *Hercules*, pure white; *Turban noir*, chestnut brown; *grandiflòra*, crimson rose; *Souci doré*, orange and brown.

Of the numerous alpine and other species, few are in general cultivation. The double-flowered varieties popularly known as Batchelor's Buttons are the most familiar.

3. *R. aconitifòlius*, syn. *R. platanifòlius.* — The double variety of this species is the only one in general cultivation under the name of White Batchelor's Buttons. It is a handsome herbaceous plant, about 2 feet high, with beautiful 5-lobed leaves, and terminal panicles of pure white flowers. This is the plant called in some districts 'Fair Maids of France.' It is a native of Central Europe, flowering towards the end of Spring.

4. *R. ácris.* Crowfoot.—The single-flowered plant is one of our commonest Buttercups, growing about 2 feet high, with spreading branches and bright yellow flowers. The leaves are deeply 5- to 7-partite. It is the only tall branching perennial native species with lobed leaves we have, and may be seen by almost every road-side. The double variety, Yellow Batchelor's Buttons, is seldom seen now.

5. *R. bulbòsus, flore pleno.*—Like the last this is a common native plant, especially in the South of England. This rarely exceeds a foot in height, and has an erect usually unbranched stem and ternately divided leaves. The base of the stem is enlarged, hence the name. The flowers are rather larger in this, but fewer in number.

6. *R. Língua.* Spearwort.—One of our handsomest native species inhabiting marshy districts. Stem branched, from 2 to 3 feet high, with sessile lanceolate entire or slightly-toothed stem-clasping leaves and bright yellow flowers 2 inches in diameter.

7. *R. aquátilis.* Water Buttercup.—This familiar early-flowering aquatic plant, with floating stems, more or less divided leaves, and pure white flowers, needs little description. There are very many varieties, all of them pretty.

8. *R. Ficària*, Pilewort or Buttercup, is the common native Spring-flowering species with radical cordate shining leaves and bright glittering yellow flowers on short stalks scarcely exceeding the leaves.

Tribe IV.—*HELLÉBOREÆ.*

Sepals imbricate. Petals small, or deformed, or none. Carpels many-seeded.

6. CÁLTHA.

Marsh or semi-aquatic herbs with fleshy creeping rootstocks. Leaves petiolate, cordate, glabrous. Flowers few, terminal, yellow. Sepals 5 or more, petaloid. Petals none. Carpels several, many-seeded. Name from *κάλαθος*, a cup.

1. *C. palústris.* Marsh Marigold.—A showy native plant growing on the margins of streams and in swampy places, producing its large yellow flowers in Spring. There is a double-flowered variety (fig. 9) in cultivation.

7. TRÓLLIUS.

Erect perennials. Leaves deeply palmately lobed. Flowers terminal, large, globular, yellow or lilac. Sepals 5 to 15, petaloid. Petals 5 to 15, small, narrow, shortly clawed, with a glandular pit at the base of the blade. Carpels many, several-seeded. Few species, natives of temperate Europe, Asia, and North America. Name from *trol*, a globe, in Old German.

1. *T. Europæus* (fig. 10). Common Globe Flower.—This plant is a native of Britain and the mountains of Central Europe generally. It is in bloom from May to July.



Fig. 9. Caltha palustris flore pleno. (¼ nat. size.)



Fig. 10. Trollius Europæus. (¼ nat. size.)

Flowers lemon-yellow. *T. Asiáticus* has dark orange rather larger flowers; *T. Caucásicus* bright yellow; and *T. Americànus*, a dwarfer species, has also yellow flowers with spreading sepals.

8. ERÁNTHIS.

Dwarf herbs with creeping fleshy rootstocks and radical palmate leaves appearing after the flowers. Scape about four inches high, furnished with a single stem-clasping leaf, whose verticillate segments have the form of an involucre. Flower solitary, terminal, yellow. Sepals from 5 to 8, coloured, regular and narrow. Petals small and inconspicuous. Carpels stalked. Name from ἦρ, Spring, and *ἄνθος*, a flower.

1. *E. hyemàlis* (fig. 11). Winter Aconite.—One of the earliest



Fig. 11. Eranthis hyemalis. (½ nat. size.)

Spring flowers, possessing the valuable quality of flourishing in almost any soil or situation. Native of Italy.

9. HELLÉBORUS.

Perennial herbs with thick rhizomes and palmately, digitately or pedately divided leaves on long petioles. Flowers solitary or panicled, rather large, white, greenish, or dull purple. Sepals 5, regular, petaloid, commonly persistent. Petals small, tubular, and inconspicuous. Carpels numerous, sessile or shortly stalked. There are about twelve species, all natives of temperate Europe and Asia. The name is derived from ἑλεῖν, to injure, and *βορά*, food, in allusion to the poisonous properties.

1. *H. nìger* (fig. 12). The Christmas Rose.—This is the only species in general cultivation, and is too well known to need description. The beautiful white or pinkish flowers are produced about Christmastide. It is a native of Austria.

2. *H. Olýmpicus*, syn. *H. orientàlis*. A very handsome species, with foliage resembling that of *H. nìger*, but appearing with the flowers in early Spring. The latter are large and numerous, and bright rose in the best variety. A native of S. Europe and Asia Minor, and said to bear London smoke well.

3. *H. viridis.*—A dwarfer plant, with digitately 5- to 7-foliolate leaves; leaflets narrow, serrated. In the ordinary form the flowers are green, but there are several varieties differing



Fig. 12. Helleborus niger. (¼ nat. size.)

in the size and colour of the flowers, amongst which we may mention *atropurpùreus*, bearing large purplish red flowers.

There are two or three other species in cultivation: as, *H. Cólchicus*, having large panicles of red flowers in March; *H. fœtidus*, with greenish flowers tinted with dull purple; *H. lìvidus*, 2 to 3 feet high, with ternate leaves and bracteate racemes of livid flowers, etc. *H. atrorùbens* is a fine variety of hybrid origin.

10. NIGÉLLA.

Erect annuals with alternate finely dissected compound leaves. Flowers solitary, terminal, yellow, blue, or white, surrounded by a finely divided leafy involucre in some species. Sepals 5, regular, petaloid. Petals small, bifid. Carpels 3 to 10, more or less combined. Natives of the Mediterranean region. The name is said to be derived from *niger*, black, in allusion to the colour of the seeds.

1. *N. damascèna.* Devil-in-a-Bush, Love-in-a-Mist.—About 2 feet high, with finely-cut leaves and pale blue flowers encircled by a leafy involucre.

2. *N. Hispánica.*—With larger white, lilac, or dark purple flowers, and no involucre. Both flower in Summer.

11. AQUILÈGIA.

The Columbines are amongst the most familiar of herbaceous plants. Leaves alternate and ternately divided. Flowers very showy, solitary or panicled, blue, white, yellow, scarlet, or yellow, or some combination of these colours. Sepals 5, petaloid, deciduous. Petals normally 5, concave, produced downwards into a spur between the sepals. Carpels 5, sessile, free. Temperate regions of the northern hemisphere. Name from the Latin *aquila*, an eagle, from the form of the petals.

1. *A. vulgàris* (fig. 13). Common Columbine.—The only native species, and as such with blue or, rarely, white flowers; though under cultivation it has produced an endless number of varieties, many of them very handsome and brilliantly coloured, including almost every describable tint. There are also double-flowered varieties in which the spurs of the petals are inserted one in the others in a most remarkable manner. It grows from 2 to 4 feet high. The spurs are hooked, and the follicles hairy.



Fig. 13. Aquilegia vulgaris. (⅓ nat. size.)

2. *A. alpìna.*—A pretty little plant, about a foot high, with finely cut leaves and large white or blue with a white centre flowers. It is a native of Switzerland, blooming in May.

3. *A. glandulòsa.*—A showy species, of which there are several varieties in cultivation. The flowers are very large, blue and white, the petals shortly spurred. A native of Siberia.

4. *A. jucúnda.*—One of the handsomest of the genus, having unusually large flowers, whose calyx is bright blue and the corolla blue and white; spurs short, curved. Also from Siberia.

5. *A. Canadénsis.*—A tall, graceful, variable species, with loose panicles of bright red and internally orange-coloured drooping flowers. The flowers appear in June, and are narrower

than in most species, and the spurs short and straight. North America.

6. *A. Skìnneri.*—A dwarf-growing species, similar to the last in the colouring of its flowers, but the spurs are very long in proportion, and the sepals green as well as the upper part of the petals. A native of Guatemala, flowering in Spring.

7. *A. áretica*, syn. *A. formòsa.*—Allied to the last, but with larger, brighter coloured flowers. Sepals and spurs scarlet, limb of the petals yellow. A native of western North America.

12. DELPHÍNIUM.

The Larkspurs are erect leafy annual or perennial herbs. Leaves alternate, variously lobed or cut. Sepals 5, cohering below, the upper spurred behind. Petals 2 to 4, small, the two dorsal spurred within the spur of the sepal, the two lateral spurless or absent. Carpels 1 to 5. Natives of the temperate zone of the northern hemisphere. Named from δελφίν, a dolphin, from the form of the flowers. The species are very numerous and ornamental, but there are only about six in general cultivation.

The three following are the commonly cultivated annual species :—

1. *D. Ajácis.*—A slightly-branched erect plant, about 18 inches high. This is the parent of the variously-coloured double and single 'Rocket Larkspurs' (fig. 14). It has long racemes and hairy follicles. South of Europe.

2. *D. Consólida.*—A more branched plant with shorter racemes and glabrous follicles. This is probably the parent of some of the garden varieties. S. Europe.

3. *D. cardinàle.*—A beautiful scarlet-flowered species, 2 to 3 feet high. Native of California.



Fig. 14. Delphinium Ajacis. (¼ nat. size.)

Among the perennial species we may enumerate :—

4. *D. elàtum* (fig. 15). Bee Larkspur.—An erect plant, 5 or 6 feet high, with 5-lobed leaves and single or double blue flowers. From Siberia, flowering towards the end of Summer.

5. *D. nudicaùle.*—This is a very showy species, and still rather rare in gardens. It grows a foot or more high, with tripartite somewhat fleshy leaves; segments lobed or toothed.



Fig. 15. Delphinium elatum. (¼ nat. size.)

Flowers bright red tinged with orange. A native of California, flowering in Summer.

6. *D. grandiflòrum.*—Another species of Siberian origin. A rather smaller, branching plant. Flowers large, deep dark blue, produced all the Summer.

Besides the above species there are many very beautiful garden varieties of hybrid origin. Amongst the best are: *formòsum*, bright blue and white; *Hendersòni*, bright blue; *Hermann Stenger*, blue and rose, double; *grandiflòrum álbum*, white; and *magníficum*, intense blue.

13. ACONÌTUM.

Erect perennial poisonous herbs with palmately divided leaves. Flowers in racemes or panicles, blue, purple, yellowish, or white. Sepals 5, the dorsal or upper one helmet-shaped, the two lateral broader than the two anterior. Petals 5, small, the two upper with long claws hooded at the tip; the three inferior smaller or undeveloped. Carpels 3 to 5, sessile, free, many-seeded. The classical name. There are about twenty species, natives of the mountains of the north temperate zone.

1. *A. Napéllus* (fig. 16).—Common Monkshood. This is found in almost every old cottage garden. The typical form has blue flowers, but there are several varieties with white and blue flowers, differing in size and form. A widely distributed plant throughout temperate Europe and Asia.

2. *A. Lycóctonum.* Wolfsbane. — Very distinct from the foregoing, attaining a height of 6 or 7 feet, having large deeply divided leaves and yellowish flowers. Like the last, a Summer-flowering plant. Native of the South of Europe.



Fig. 16. Aconitum Napellus. (¼ nat. size.)

Zanthorhìza apiifòlia, Yellow-root, is a dwarf shrubby plant from North America, with pinnate or bipinnate leaves and panicled racemes of drooping dull purple regular flowers. Sepals 5. Petals 5, smaller than the sepals, clawed. *Hydrástis Canadénsis*, Orange-root, is an allied herbaceous perennial with one large lobed radical leaf and two smaller ones on the flower-scape, which bears one small greenish flower destitute of petals. *Actæa spicàta*, Baneberry, is a native plant of this affinity. It is a perennial, with ternately divided leaves and small racemose flower succeeded by a several-seeded bluish-black berry. North of England, and northern temperate regions generally.

Tribe V.—*PÆONIEÆ.*

Sepals imbricate. Petals large. Carpels seated on a fleshy disk, many-seeded, indehiscent.

14. PÆONIA.

A genus of herbaceous or shrubby plants with large alternate lobed or dissected leaves and immense showy crimson, purple, rose, pink, or white flowers. Sepals 5, not petaloid, persistent. Petals 5 to 10 in the single flowers. Carpels 2 to



Fig. 17. Pæonia Moutan. (¼ nat. size.)

5, coriaceous when ripe. Species few, but widely spread, extending from Central Europe, through temperate Asia, to China,



Fig. 18. Pæonia Moutan. (¼ nat. size.)

and one species to North-western America. Named after *Pæon*, a physician. The enormous flowers of some of the double

varieties are very striking and handsome, though the single ones are preferred by some growers. All are very effective amongst shrubs and on the margins of plantations.

1. *P. Moután* (figs. 17 and 18).—A native of China, introduced towards the end of last century. The only shrubby species in cultivation, and the parent of all the beautiful varieties called Tree Pæonies. There are double and single white, pink, crimson, purple, and striped varieties. This is a somewhat tender plant, requiring slight protection in Spring.

2. *P. officinàlis.*—From this species have sprung many of the most familiar crimson, red, and a few white varieties. It is usually a taller plant than *P. albiflòra*, which it closely resembles in some of its forms. The leaves are not so equally lobed as in the latter, and the carpels are hairy. South of Europe and temperate Asia.

3. *P. albiflòra* (fig. 19), syn. *P. édulis* and *P. Sinénsis.*—A native of China and Siberia, normally white-flowered. The



Fig. 19. Pæonia albiflora. (¼ nat. size.)



Fig. 20. Pæonia tenuifolia. (⅛ nat. size.)

carpels are smooth, and recurved from the base. It is highly fragrant, its perfume having been compared to that of the rose. Under cultivation it has given birth to pink, crimson, and flesh-coloured varieties. This, however, may be ascribed to cross-fertilisation with other species.

4. *P. décora.*—A purple-flowered species from Asia Minor, Leaves tripartite ; lobes oblong, obtuse, hairy beneath.

5. *P. Wittmanniàna.*—Distinguishable from all the others by its bright yellow flowers. A native of the Caucasus.

6. *P. tenuifòlia* (fig. 20).—A Siberian plant, remarkable for its finely dissected foliage. It is of smaller stature and more compact growth than the other species, and the flowers are not quite so large. They are dark crimson, either single or double, and appear in May.

7. *P. paradóxa.*—Leaves glaucous, ternate, lobes rather obtuse with undulating margins, hairy beneath. Flowers purple or crimson, single or double. There is also a variety with prettily fringed petals. From the Levant, flowering in May.

Order II.—CALYCANTHÀCEÆ.

Deciduous shrubs with opposite undivided entire exstipulate leaves and solitary axillary often fragrant or aromatic flowers. Sepals and petals in many series, the outermost small and bract-like, the inner petaloid, inserted on the outside of a fleshy urceolate torus having the appearance of the tube of a perianth. Stamens numerous, inserted at the mouth of the torus. Carpels many, free, included within the tubular torus, 1- or 2-seeded ; seeds erect, exalbuminous. A small group of about four species from North America and Japan. The only two genera referred here are both represented in our gardens.

1. CALYCÁNTHUS.

Stamens in many series, the twelve outer fertile. Flowers purple, lurid red or brownish, appearing in Summer. There are three North American species, with seven or eight names. Derived from *κάλυξ*, cup or calyx, and *ἄνθος*, a flower, from the coloured sepals.

1. *C. flóridus.* Carolina Allspice.—Leaves oval or rotundate, rounded at the base, hispid above, softly pubescent beneath. Flowers very shortly pedunculate. A compact free-flowering species, very common in gardens. There are several varieties in nurseries, under the names *nànus, inodòrus, Pennsylvánicus, asplenifòlius*, with cut leaves ; *bullàtus*, with bladdery leaves, etc.

2. *C. occidentàlis.*—Leaves oblong or ovate-cordate, acuminate, hispid above, slightly pubescent on the veins only beneath. A

larger-growing shrub than the last, with larger leaves and fewer larger brighter coloured inodorous flowers on distinct peduncles. This includes *C. macrophýllus* of gardens.

C. lævigàtus or *glaùcus* is a variety or species seldom seen in gardens, having the under side of the leaf of a pale glaucous tinge.

2. CHIMONÁNTHUS.

Stamens in two series, the five outer fertile. Flowers yellowish, appearing in Winter before the leaves. The only species is a native of Japan. Name from *χειμών*, winter, and *ἄνθος*, a flower.

1. *Ch. fràgrans*, syn. *Calycánthus prìcox.*—A slender branching shrub with lanceolate acutely acuminate leaves hispid above, glabrous beneath. Flowers very fragrant. The variety *grandiflòrus* is the best.

Order III.—MAGNOLIÀCEÆ.

Evergreen or deciduous, often aromatic trees or shrubs. Leaves alternate, simple, usually entire, with convolute or opposite deciduous stipules, or exstipulate. Flowers axillary or terminal, usually solitary, often large and showy. Sepals and petals hypogynous, in 3 or more series, imbricate. Stamens numerous; filaments often dilated or fleshy. Carpels usually numerous, free or cohering together, verticillate or imbricated, and inserted upon a more or less elongated or enlarged torus, either opening in valves or rarely across the base, or woody, or fleshy and indehiscent. Seeds 1 or 2 or more; testa crustaceous or double, the outer crustaceous and the inner fleshy; albumen copious, oleaginous, not ruminated. A very distinct order amongst hardy trees and shrubs, and one which furnishes some of the handsomest ornaments of our gardens.

Tribe I.—*WINTEREÆ.*

Flowers hermaphrodite. Carpels verticillate. Stipules none.

1. ILLÍCIUM.

Aromatic evergreen shrubs or small trees. Sepals 3 or 6, membranaceous. Petals many. Filaments fleshy. Carpels several, in a single whorl, 1-seeded, coriaceous, dehiscing along

the inner or superior margin. One North American species, and four or five from China and Japan.

1. *I. religiòsum*, syn. *I. anisàtum*.—A small shrub with terminal clusters of small yellowish white flowers. This is tender and rarely seen.

Tribe II.—*MAGNOLIEÆ.*

Flowers hermaphrodite. Carpels in several series. Stipules large, covering the leaf-buds.

2. MAGNÒLIA.

Trees or shrubs with conspicuous fragrant solitary terminal flowers. Sepals 3. Petals 6 to 12, in two or more series. Carpels many, in an oblong cone-like spike, 2-seeded, coriaceous, opening along the dorsal or outer edge to allow the scarlet or brown seeds to escape, which hang on slender funicles some time after the dehiscence of the carpels. About fourteen species, from Northern India, Japan and China, and North America. Named in honour of Magnol, a French botanist.



Fig. 21. Magnolia grandiflora. (¼ nat. size.)

1. *M. grandiflòra* (fig. 21).—A handsome evergreen tree with large leaves of a rich glossy green above, and clothed with

a ferruginous tomentum beneath. The fully expanded flowers are from 6 to 8 inches in diameter, almost pure white, and deliciously odoriferous. There are many varieties of this desirable tree in cultivation, differing in the form and size of the leaves and flowers and the season of flowering. The Exmouth variety, *M. gr. Oxoniénsis*, is one of the best. Unfortunately it will not bear more than 20 degrees (Fahrenheit) of frost without injury. It is a native of North America, flowering from June to August.

2. *M. purpùrea*, syn. *M. díscolor*.—A small deciduous shrub with large obovate dark green leaves and large tulip-shaped flowers with 6 petals purple on the outside and white within. A native of Japan, which produces its fragrant flowers very freely in the month of April.

There is a reputed variety of this called *M. Lênnei*, of larger stature, having larger flowers with more rounded petals, and said to be hardier; but it does not appear to be much known in this country.

3. *M. glaùca*. Laurel Magnolia.—A shrub with small evergreen oval or oblong glabrous leaves, light green above and glaucous below. Flowers white, fragrant, from 2 to 3 inches in diameter. Appearing in Summer. This is a very hardy species, though less showy than some others. *M. longifòlia*, *Gordoniàna*, *latifòlia*, etc., are forms of this species. North America.

4. *M. conspícua*, syn. *M. Yulán* (fig. 22).—For the size and beauty of its flowers this shrub ranks next to *M. grandiflòra*; but the white flowers, although very abundant, are not so effective, on account of their being produced in early Spring before the appearance of the leaves. There are double-flowered varieties, and one, called *Soulangeàna*, having the petals tinged with purple. A native of China, and rather tender.



Fig. 22. Magnolia conspicua. (¼ nat. size.)

5. *M. tripétala*, syn. *M. Umbrélla*. Umbrella Tree.—A small tree 20 to 30 feet high. Leaves lanceolate, crowded at the ends of the branches, a foot or more long, glabrescent. Flowers very large, white, slightly scented, appearing in May or June. *M. Fràseri* is an allied species having the leaves auricled at the base. North America.

6. *M. acuminàta.* Cucumber Tree.—A large handsome tree with oblong or ovate-acuminate leaves. Flowers oblong, greenish yellow, relatively small. North America. The young fruit resembles somewhat a small cucumber.

7. *M. macrophýlla.*—A tree from 20 to 40 feet high, having large obovate scattered leaves auricled at the narrowed base and silvery pubescent beneath. Flowers large, campanulate, white, with a purple centre. A native of North America.

8. *M. Campbéllii.*—This is a magnificent arboreous species from the mountains of India, having large ovate-lanceolate leaves silky hairy beneath, and splendid crimson and white flowers rivalling those of *grandiflòra* in size, and exceeding them in brilliancy. It is scarcely hardy, and still very rare in this country.

3. LIRIODÉNDRON.

Sepals 3, reflexed. Petals 6, connivent in two imbricated series. Carpels in an oblong spike, 2-seeded, at length samaroid and indehiscent. Only one species is known, a native of North America. The name is from λείριον, a lily, and δένδρον, a tree.

1. *L. tulipífera.* Tulip Tree.—This is one of the noblest hardy exotic trees we have. In its native habitat it attains a height of 150 feet, and even in England there are many specimens from 75 to 100 feet high, which often produce their yellow or orange sweet-scented flowers in great profusion. The habit resembles that of the erect-growing Plane, and its ample foliage renders it equally ornamental and effective. The remarkable 4-lobed truncate leaves are alone sufficient to distinguish this from any other tree in cultivation.

There is a variety distinguished by its larger foliage; another, called *integrifòlia*, in which the inferior lobes are wanting; and a third, in which the lobes are unusually large, is called *obtusilòba*. The variegated forms offer nothing special.

Tribe III.—*SCHIZÁNDREÆ.*

Flowers unisexual. Carpels baccate, in several series, forming a head or spike. Climbing shrubs destitute of stipules.

4. SCHIZÁNDRA (including *Maximowíczia*).

Leaves, simple, membranaceous, with pellucid dots. Peduncles solitary, 1-flowered. Flowers red, yellow, or white. Sepals and

petals 9 to 12, gradually increasing in size inwards, innermost only coloured. Stamens united in a globular mass. Carpels numerous, indehiscent, when ripe loosely spicate. Species 6, one from North America, the rest from tropical and eastern Asia. Name from σχίζω, to cut, and ἀνὴρ, a male, in allusion to the split anthers.

1. *S. coccínea.*—A tender North American climbing or trailing plant with oblong acuminate petiolate leaves and scarlet flowers, rarely seen in cultivation, and requiring protection even in the South-west of England.

2. *S. Chinénsis*, syn. *Maximowiczia Chinénsis.*—A handsome hardy climbing species, growing 20 feet high. Leaves oval, bright green. Flowers bright rosy carmine, succeeded by scarlet berries, which are persistent during a great part of the winter. North China.

5. KADSŪRA.

This differs mainly from the last in the globose head of carpels and coriaceous leaves. There are seven species, all Asiatic. The Japanese name of one species.

1. *K. Japónica.*—A small shrub with lanceolate acutely acuminate remotely toothed leaves. Flowers solitary and axillary, yellowish white, about an inch in diameter, succeeded by clusters of scarlet berries. A native of Japan, flowering in Autumn.

Order IV.—ANONÀCEÆ.

Trees or shrubs with alternate exstipulate leaves, tetramerous calyx and corolla, numerous stamens, consolidated fruit, and seeds with ruminate albumen. Nearly all the species are tropical except the following:—

Asímina trilòba.—A small tree or shrub, native of North America, where it is known under the name of Common Papaw. Leaves deciduous, obovate-lanceolate, obtusely acuminate, hairy when young. Flowers campanulate, of a chocolate brown, about 2 inches in diameter, produced between the upper leaves. Fruit oblong pulpy, 2 to 3 inches long, yellow and edible.

Order V.—MENISPERMÀCEÆ.

The Moonseed family affords few hardy species. They are chiefly climbing shrubs with alternate exstipulate leaves and

diœcious small inconspicuous flowers. The most remarkable characteristic of most members of this group is the curved carpels in which the base and proper apex are brought almost close together. There are something like 300 species, chiefly found within the tropics.

1. MENISPÉRMUM.

Climbing deciduous shrubs with large peltate or cordate palmately lobed leaves and paniculate flowers. Sepals 4 to 8, in two series. Petals 6 to 8, shorter than the sepals. Male flowers with from 12 to 24 stamens, whose anthers are 4-celled. Female flowers with 6 sterile stamens and 2 to 4 woody 1-seeded carpels in the form of a horse's shoe. Seed amphitropal, with fleshy albumen and a small embryo. Two species are described: one from eastern temperate Asia, and the following from North America. The name is from *μήνη*, the moon, and *σπέρμα*, a seed, from the crescent-shaped carpels.

1. *M. Canadénse.* Moonseed.—Leaves large, reniform, peltate. Flowers small and inconspicuous. This shrub is valuable only for its large handsome foliage, for covering bowers, etc. *M. Caroliniànum* is a variety with lobed leaves.

Order VI.—BÉRBERIDEÆ.

Herbs, or erect or climbing shrubs. Leaves alternate, or fascicled from the non-development of the branches, simple or compound, often spinose or reduced to spines. Flowers terminal or axillary, usually racemose, often yellow. Sepals and petals similar, in 2 or more series. Stamens 4 to 8, opposite the petals; anthers opening by valves or slits. Carpel solitary or 3 to 9, 1-celled; stigma usually peltate; ovules 2 or more, basal or on the ventral suture, anatropous, raphe ventral. Fruit a berry or capsule; seeds albuminous. An order of about 100 species, inhabiting the temperate regions of both hemispheres and the mountains of the tropics. Absent from South Africa and Australasia. Astringent properties. This order furnishes many beautiful hardy shrubs, notably *Bérberis Darwínii* and *Japónica.*

1. BÉRBERIS.

Erect or trailing spiny shrubs with yellow wood. Leaves simple or compound, often with spinose teeth, sometimes

reduced to spines. Flowers yellow, solitary, racemose or fascicled. Sepals 8 or 9, outer minute. Petals 6, in two series, glandular at the base. Stamens 6, opening by two upward valves. Carpel 1, baccate, with a few basal seeds. The species and varieties are numerous, and natives of Europe, Asia and America, from Oregon to Fuega. The name is of Arabic origin.

The species may be conveniently divided into two sections.

§ 1. *Leaves simple, usually fascicled* (*Bérberis proper*).

1. *B. vulgàris.* Common Barberry.—Although this is a very pretty deciduous shrub, especially when laden with its orange-scarlet fruit, there are several evergreen species of better habit and with handsomer flowers, that are more commonly planted for ornament. Leaves oblong-obovate, with spiny teeth. Flowers yellow, in terminal drooping racemes, appearing in May or June. A native of Great Britain. There are several varieties, including scarlet- yellow- and white-fruited and purple-leaved.

2. *B. aristàta*, syn. *B. umbellàta*?—In appearance this resembles No. 1. It is armed with strong tripartite thorns, and the leaves are almost persistent and deeply serrated. Flowers yellow, cymose ; cymes on long pendulous peduncles. This is of erect habit, with deeply furrowed reddish brown branches. A native of Nepal, flowering in May.

3. *B. Darwínii.*—This is perhaps the handsomest in cultivation, and the most extensively planted. It forms a densely branched spreading decumbent evergreen bush with dark glossy leaves and orange-yellow flowers. There are about four leaves in each fascicle, on short petioles, oval or oblong, about an inch long, with usually five spiny teeth. Flowers in racemes, very profuse, produced in May and sometimes again in Autumn. A native of South Chili.

4. *B. dùlcis.*—An erect spiny evergreen shrub. Leaves about 4 together, glabrous, very shortly petioled, ovâl or oblong, about 8 lines long, entire, slightly coriaceous. Flowers solitary, on slender peduncles, yellow. Berries bluish black. This is one of the forms of *buxifòlia* or *microphýlla*, a variable shrub from Chili.

5. *B. empetrifòlia.*—A dwarf evergreen species about 18 inches or 2 feet high. Leaves in fascicles of about 7, on short slender petioles, linear, closely revolute, giving them the appearance of being terete, sharply mucronate. Flowers

yellow, terminal, few, sub-umbellate, on slender pedicels. A native of the extreme South of America; very hardy, often flowering both in Spring and Autumn. *B. stenophýlla* is said to be a hybrid between this species and *B. Darwínii*. It has narrow mucronate leaves and a profusion of pretty yellow flowers followed by dark-purple berries.

6. *B. ilicifòlia.*—A very handsome branching spiny evergreen shrub. Leaves petiolate, oblong, narrowed at the base, thick and glossy and beset with spiny teeth. Flowers large, orange tinged with red, from 4 to 6 together in short racemes. This species appears to be very rare in collections, but we give it a place here on account of its great beauty. It is a native of the extreme South of America.

B. Knightii, concínna, Chinénsis, etc., are less widely grown species of this group.

§ 2. *Leaves pinnate, persistent* (*Mahònia*).

7. *B. aquifòlia*, syn. *Mahònia aquifòlia.* — This is the common species of this section. A bush about 6 feet high, with creeping suckers. Leaves 7 to 8 inches long, of about 7 ovate-lanceolate remotely spiny-toothed glabrous glossy green slightly coriaceous leaflets. Leaflets 2 to 3 inches long, rounded at the base, acute at the apex, with minutely reticulated venation, lowest pair about 2 inches from the base of the petiole. Flowers yellow, in clusters of terminal racemes, appearing in Spring. Native of North America.

B. rèpens (fig. 23).—Is probably a variety of the last, with trailing or procumbent stems. Also from North America.

8. *B. glumàcea*, syn. *B. nervòsa.* — A very dwarf slow-growing shrub, resembling in a great measure the preceding. Leaves tinged with red in autumn, about a foot long, of about 13 narrowly lanceolate coriaceous glabrous leaflets with remote rigid spiny teeth. Venation of the leaflets elevated, distant, anastomosing with intermediate free veinlets, lower pairs about 4 inches from the base of the petiole. Flowers yellow tinged with red, in terminal clusters of racemes emerging from linear pointed glume-like bracts. A native of North-west America, flowering in Spring.

9. *B. Bèalii.*—A very distinct species with erect unbranched stems and leaves about a foot long. Leaflets usually 9, very coriaceous, about 3 inches long, quite sessile, broadly cordate or rotundate at the base, irregular in outline, oblique, with

about 5 long spiny teeth, and a terminal one, the lowest pairs close to the base of the petiole. A handsome shrub with



Fig. 23. Berberis repens. (¼ nat. size.)

foliage of a yellowish green tint, bearing terminal clusters of racemes of yellow flowers in early Spring. *B. Japónica*, a slightly different form with narrower leaves and longer slender racemes, belongs to this species. *B. intermèdia* is another name of this variety. A native of Japan.

10. *B. Fortùnei.*—Leaflets about 7, linear-lanceolate, distant, with numerous small spiny teeth, lower pair remote from the base of the petiole. Flowers small, yellow, in terminal clustered racemes. A native of China.

B. pinnàta, syn. *fasciculàris*, and *B. Nepalénsis* are rarer species, the former from Mexico. The latter is very near *B. Bèalii.*

2. BERBERIDOPSIS.

A genus of a single species of climbing habits. Sepals and petals 9 to 15; outer small, spreading, intermediate, orbicular, concave; inner obovate-cuneate, erect, inserted upon the fleshy torus. Stamens 8 or 9, free; anthers dehiscing longitudinally. Ovary 1-celled, with 3 parietal placentas. Name from *Bérberis*, and ὄψις, resemblance.

1. *B. corallìna.*—Leaves about 3 inches long, alternate,

simple, glabrous, petiolate, oblong-cordate, obtuse or acute, spiny-toothed. Flowers crimson, in terminal drooping racemes, leafy at the base. A handsome subscandent shrub from Chili.

3. EPIMÈDIUM.

A small genus of elegant compound-leaved dwarf herbs with creeping rhizomes. Leaves ternately or pinnately divided. Flowers in terminal, simple or branched racemes. Sepals 8, petaloid, flat, the four outer smaller. Petals 4, small, cucullate, or spurred. Stamens 4. Carpel 1, many-seeded. Confined to temperate Europe and Asia. A Greek name applied to a similar plant.

1. *E. alpìnum* (fig. 24).—One of the prettiest, though not so large flowered as some of the others. It grows about a foot



Fig. 24. Epimedium alpinum. (⅓ nat. size.)

high, with slender hard and shining stems and petioles. Flowers brown and yellow. A native of the Alps, flowering in May.

2. *E. violàceum.*—Has narrow leaflets and violet flowers. A native of Japan.

3. *E. macránthum.*—This is the handsomest of the genus,

growing about 9 inches high, and bearing comparatively large white flowers. A native of Japan.

There are several other species, as *diphýllum*, *ròseum*, *lilacìnum*, and *Sinénse*, white tinged with rose or violet; and *sulphùreum* and *pinnàtum*, yellow and purplish brown.

4. PODOPHÝLLUM.

A singular genus of two species, one Indian and the other American, having fleshy rhizomes and erect stems, bearing usually 2 large opposite palmately-lobed leaves and a solitary white flower. Sepals 6, petaloid. Petals 6 to 9, larger than the sepals. Fruit an indehiscent berry. Name from *πούς*, a foot, and *φύλλον*, a leaf, in reference to the form of the leaves.

1. *P. peltàtum* (fig. 25). May Apple.—The American



Fig. 25. Podophyllum peltatum. (½ nat. size.)

species. This has white berries; and the Indian, *P. Emòdi*, bright red. They are both marsh plants.

5. AKÈBIA.

A small genus of climbing shrubs with the leaves digitately 3- or 5-foliolate. Flowers few, in axillary racemes, violet-coloured, polygamous. Sepals 3. Petals none. Male flowers with 6 free stamens and a rudimentary ovary. Female flowers with 6 or 9 rudimentary stamens. Carpels 3 to 9, stigma peltate; seeds immersed in pulp. About four species, natives of Japan and China. The native name of the Japanese species.

1. *A. quinàta.*—A pretty twining plant with the leaves on very slender petioles, and palmately divided into usually 5 distinct petiolulate oval or oblong emarginate leaflets, the basal pair smallest. Flowers small, purplish brown, very fragrant. A native of Japan, hardy in the south-western counties only.

6. LARDIZÁBALA.

Climbing shrubs with bi- or tri-ternate leaves and diœcious flowers. Sepals 6, somewhat fleshy. Petals 6, much smaller. Stamens 6, monadelphous. Carpels 3, seeds numerous. Flowers axillary, violet or purple, male racemose, female solitary. There are two Chilian species. Named in honour of a Spanish botanist.

1. *L. biternàta.*—A tall evergreen climber with the dark glossy green leaves twice ternate. Flowers purple, in drooping racemes, appearing in December. This needs the protection of a wall.

Order VII.—**NYMPHÆÀCEÆ.**

Aquatic herbs easily recognised by their large flat cordate or peltate leaves and showy flowers. Sepals 3 to 5. Petals 3 to 5, or numerous, sometimes small. Stamens many. Carpels 3 or more, in one whorl or series, adnate to a fleshy disk forming a several-celled ovary; styles equal in number to the carpels; stigma peltate or decurrent; ovules many, scattered over the walls of the cells; ovules orthotropous. Fruit with consolidated or free carpels; seeds numerous; albumen farinaceous. Fresh-water plants, not numerous in species, but very widely spread. The hardy species are limited to our well-known white and yellow Water-Lilies, with a few others from North America and Siberia.

1. NYMPHÆA.

To this genus belongs our White Water-Lily, together with several splendid, though unfortunately not hardy species, having crimson, rose, or blue flowers, natives of Australia and South Africa. Besides the flowers being much larger and never yellow, this is technically distinguished from *Nùphar* by having 4 sepals and numerous conspicuous petals as large as or larger than the sepals. Dedicated by the Greeks to the water-nymphs. They are all Summer-flowering plants.

1. *N. álba* (fig. 26). White Water-Lily.—Leaves orbicular,



Fig. 26. Nymphæa alba. (⅛ nat. size.)

cordate at the base, quite entire. This is one of our most beautiful indigenous aquatic plants.

2. *N. odoràta.*—A North American species, closely resembling the last, but the flowers are slightly tinged with rose and deliciously scented.

N. nítida, a native of Siberia, has elliptical cordate shining deeply-lobed leaves with spreading lobes and white flowers, and *N. pýgmæa* is a charming miniature of the foregoing. A native of China, and equally hardy.

2. NŪPHAR.

In this genus the sepals, which exceed 4 in number, are coloured, and conceal the smaller scale-like petals. Flowers always yellow, globose, and smaller than in *Nymphæa*. There are four or five species, all natives of the temperate zone of the northern hemisphere. The name is from the Arabic *Naufar*.

1. *N. lùtea* (fig. 27). Yellow Water-Lily, Brandy-Bottles.—Leaves orbicular, deeply lobed at the base; lobes contiguous or overlapping. There is also a smaller form of this species.

2. *N. pùmila.*—Leaves oblong, lobes at length spreading.

Very much like the last, but differing in the smaller more orbicular petals, shorter anthers, and the stigma lobed at the



Fig. 27. Nuphar lutea. (½ nat. size.)

margin. Also British, but limited to the lakes of Scotland and Shropshire in England.

N. ádvena is similar to No. 1, but rather larger, and the flowers of a brighter colour. It is a native of North America.

Order VIII.—PAPAVERÀCEÆ.

Herbs, or very rarely shrubs, glaucescent or pilose; juice often coloured. Leaves alternate, or the floral occasionally opposite, entire, lobed, or finely divided, destitute of stipules. Peduncles 1-flowered, or rarely subumbellate, often lengthened, terminal, or from the axils of the upper leaves. Flowers regular or irregular. Sepals 2 or 3, rarely 4, very caducous. Petals 4 to 6, occasionally more, in two or three series, often crumpled. Stamens numerous, free, or few, and with connate filaments. Ovary free, 1-celled, with many-ovuled parietal placentas, or 2- or many-celled. Styles short or obsolete; stigmas radiating or lobed. Ovules anatropous. Capsule dehiscing by pores or valves, more rarely indehiscent. Seeds few or many, albuminous. The species of this order are widely distributed, chiefly in the temperate parts of the northern hemisphere. Narcotic, acrid, or poisonous plants. Opium is the product of a species of Poppy. Chiefly valuable to the gardener for the showy annuals it abounds in.

Sub-Order I.—Papàvereæ.

Petals similar; stamens numerous.

1. PLATYSTÈMON.

A small genus of annual herbs with narrow entire leaves. Flowers on long peduncles, yellow. Sepals 3. Petals 6. Stamens numerous, with dilated filaments. Carpels numerous, many-seeded, at first partially united, but free when mature. The name is from πλατύς, broad, and στῆμα, a stamen. Two species have been described; they are both dwarf hardy plants of straggling habit and no great merit.

1. *P. Califórnicus.*—Leaves and capsules hairy. Native of California, flowering in August.

2. *P. leiocárpus.*—Capsules smooth, flowers yellowish white. A native of Siberia.

2. PAPÀVER.

Showy annual and perennial herbs with lobed or dissected leaves and milky juice. Flowers on long peduncles, nodding when in bud. Sepals usually 2. Petals 4 or more. Stamens numerous. Ovary 1-celled; style short or obsolete; stigma discoid, with radiating lobes opposite the placentas, which project in towards the centre of the ovary. Capsule opening by pores; seeds numerous, small, pitted. About a dozen species are known, from Europe, North Africa, and Asia, one extending to South Africa, and one to Australia. Though the genus is poor in species, these are very prolific in varieties. The etymology of the word is obscure.

Perennial Species.

1. *P. orientàle.*—A handsome plant, 3 or 4 feet high. Stems supporting one large scarlet or orange-scarlet flower with a dark crimson spot at the base of the petals. *P. bracteàtum* (fig. 28), syn. *P. pulchérrimum*, is a variety in which the sepals are foliaceous and persistent, and the flowers much larger. A native of Western and Central Asia.

2. *P. alpìnum.*—A dwarf plant, less than a foot high, native of the mountains of Europe from the Alps to Lapland. Leaves pinnate, glaucous. Flower-stems leafless, hispid, one-flowered. Flowers large and showy, bright orange-yellow or white. *P. nudicaùle* is an allied Arctic species or variety, and *P. Pyrenàicum* is a handsome dwarf variety with trailing leaves and orange-coloured flowers.

Annual Species.

3. *P. somnìferum.* Opium Poppy.—A tall glaucous glabrous

species growing 3 or 4 feet high, with oblong variously lobed amplexicaul leaves and numerous large single or double

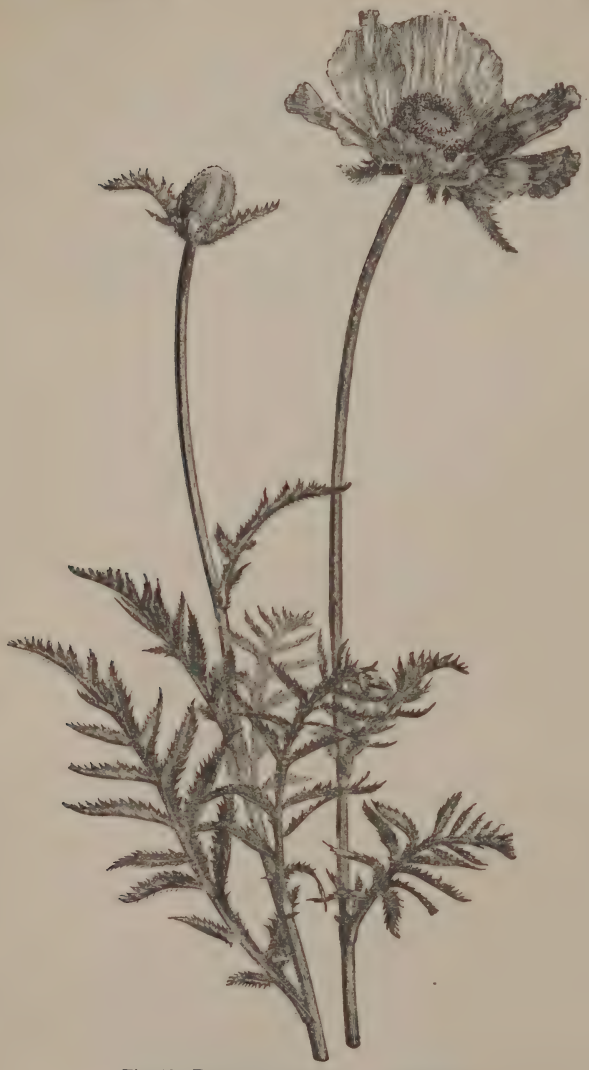


Fig. 28. Papaver bracteatum. (¼ nat. size.)

flowers of many colours, white, rose, lilac, violet, often striped, and usually with a darker spot at the base of the petals, the latter fringed in some varieties. It is believed to have originally come from Persia or India.

4. *P. Rhœas* (fig. 29).—This is the common Corn Poppy,

whose large brilliant scarlet flowers are familiar to everyone in the South of England. Under cultivation it has produced innumerable varieties, both double and single, of different colours. It is a smaller plant than the preceding, and very distinct from it in its pinnatifid hispid leaves.



Fig. 29. Papaver Rhœas, flore pleno. (¼ nat. size.)



Fig. 30. Argemone grandiflora. (¼ nat. size.)

3. ARGEMÒNE.

Branching glaucescent annual herbs with yellow juice. Leaves deeply pinnatifid, usually spiny-toothed. Flowers large, white or yellow. Similar in floral characters to the Poppies, with an oblong capsule opening by valves. Six species are known, all American. The name is probably from *ἀργεννός*, white, fair.

1. *A. Mexicàna.*—An erect branching plant, about 2 or 3 feet high, with yellow flowers about the size of the common Poppy. The petals are very caducous. This species is a common weed in the tropics.

2. *A. grandiflòra* (fig. 30).—A similar plant, with white flowers. Only admissible in a large garden, where its glaucous foliage and large flowers are very effective.

A. hispida is a fine white-flowering recently introduced species, larger even than *A. grandiflòra.*

4. MECONÓPSIS.

Perennial or annual herbs. Leaves entire or dissected. Flowers large and showy, on long peduncles, nodding when in bud. Sepals 2. Petals 4. Stamens numerous. Capsule 1-celled, oblong, opening by short valves. There are nine species, of which one is European, two are North American, and the remainder Himalayan. The name is from μήκων, a Poppy, and ὄψις, resemblance.

1. *M. Cámbrica.*—The only European species, which is also found in some parts of western England and Wales. It is a perennial with bipinnatifid nearly glabrous leaves and pale yellow flowers on long peduncles.

There are several tall handsome species from the mountains of Northern India, three of which have been introduced, but they are very rarely seen. They have pinnatifid hispid leaves and large racemes of flowers from 2 to 3 inches in diameter. *M. Wallíchii* has them pale blue; *M. Nepalénsis* rich yellow, and *M. aculeàta* rich lilac purple.

5. SANGUINÀRIA.

There is only one species of this genus, a native of North America. It is distinguished by having 8 or more petals, not crumpled, and an oblong 2-valved capsule. The name is from the Latin *sanguis*, blood, the colour of the juice.

1. *S. Canadénsis.* Puccoon.—A perennial herb with a creeping rhizome and radical reniform 5- to 7-lobed leaves, glaucous above, hairy beneath. Scape slightly exceeding the leaves, about 6 inches high, naked, 1-flowered. Flowers white, from 1 to 2 inches in diameter, appearing in early Spring.

6. BOCCÒNIA.

Tall shrubby herbs with yellow or vermilion juice. Leaves large, lobed. Flowers small, numerous, in large terminal panicles. Sepals 2, petaloid. Petals none. Stamens numerous. Capsule stipitate, oblong, few-seeded. Named in honour of a

Sicilian botanist. These plants are grown more for their ornamental habit and foliage than their flowers.

1. *B. cordàta*, syn. *Macleàya cordàta.*—This is the original hardy species, a native of China.

2. *B. Japónica.*—A handsomer plant than the foregoing. It has large oblong glaucous leaves, deeply lobed and cordate at the base. Both grow from 4 to 6 feet high, and form very striking objects in the garden. Probably a variety of the foregoing. There are two other species, from the West Indies and Mexico.

7. ESCHSCHÓLTZIA.

Annual or perennial herbs, glabrous and glaucescent. Leaves much divided into linear segments. This genus is distinguished by the sepals of its calyx cohering in the form of a cap, which is pushed off by the expanding petals. Capsule linear. Named after a botanist. The four or five species are all natives of North-western America.

1. *E. Califórnica.*—This species was the first introduced. It is a straggling much-branched plant with large vase-shaped flowers, bright yellow in the typical form; but varieties with white, pinkish, paler yellow, and other tints are known.

2. *E. tenuifòlia.*—A much smaller plant, with the segments of the leaves almost thread-like. Both are hardy and pretty, especially the former, and continue in flower for a long period.

Sub-Order II.—**Fumàrieæ.**

Petals 4, dissimilar. Stamens 6.

8. DIELŸTRA.

Handsome erect, diffuse, or climbing perennials with much-divided leaves. Flowers in racemes, terminal, or opposite the leaves. Sepals 2, minute. Petals 4, the exterior oblong, concave, saccate or calcarate at the base, and spreading at the top; the interior clawed, cohering at the tips, and keeled or winged at the back. Stamens 6, in two bundles opposite the outer petals, the filament of the middle stamen of each bundle spurred at the base or naked. Anthers of the middle stamens 2-celled, of the lateral 1-celled. Ovary 1-celled, with 2 placentas and many ovules. There are about a dozen species, natives of North America and North-western Asia. The name is from the Greek δίς, two, and ἔλυτρον, a sheath, from the beautiful outer petals.

1. *D. spectàbilis* (fig. 31).—This magnificent hardy plant is now so familiar that details are unnecessary. Its elegant



Fig. 31. Dielytra spectabilis. (⅛ nat. size.)

ternately divided foliage and gracefully drooping racemes of locket-like flowers of white and rose are not surpassed by any known plant. It is a native of Siberia, but was introduced by Mr. Fortune from Chinese gardens.



Fig. 32. Dielytra eximia. (¼ nat. size.)

2. *D. exímia* (fig. 32).—A smaller plant than the preceding, but also very handsome. The habit, it will be seen, is quite different. It grows about a foot high, and bears rosy pink flowers in Summer. A native of North America. *D. formòsa* scarcely differs from this species.

3. *D. chrysántha.* — This has bright yellow flowers, appearing in September, and finely cut glaucous leaves. A Californian species of recent introduction, growing 4 or 5 feet high.

9. CORYDÀLIS.

This genus differs mainly from the last in having only one of the outer petals spurred or inflated, the other being flat, and in the inflated 2-valved capsule; the flowers are also smaller. The Greek name for Fumitory. Species numerous in the Mediterranean region, a few extending to America, South Africa, and north-western Asia.

1. *C. lùtea.*—A common European plant, found naturalised in some parts of England. A perennial fibrous-rooted herb, about a foot high. Leaves on long petioles, ternately divided. Flowers yellow, in leaf-opposed racemes, from May to August.

2. *C. nóbilis.*—This is a fine large yellow-flowered species, a native of Siberia, producing its flowers in early Spring. It belongs to the tuberous-rooted section, and has unbranched stems about a foot high, and dense racemes of bright yellow flowers.

C. Marshalliàna is a dwarf tuberous-rooted species from Asia Minor, having pale yellow racemose flowers and a pair of biternate leaves on each stem; *C. sólida* is a tufted species about 6 inches high, with biternate glaucous leaves and unilateral racemes of rosy flowers from the axils of laciniate bracts; and *C. tuberòsa*, syn. *C. càva*, is similar to the last, with white flowers and entire bracts. These two are both European species.

Order IX.—CRUCÍFERÆ.

This very natural group of plants is so well defined that very little difficulty is experienced in recognising its members. They are almost without exception annual or perennial herbs with stellate hairs, radical leaves in rosettes, and the cauline alternate, destitute of stipules. Flowers usually in terminal racemes, rarely solitary, commonly ebracteate. Sepals 4, of which two are often saccate at the base. Petals 4. Stamens 6, tetradynamous (in *Megacarpæa polyándra* the stamens are numerous). Ovary 2-celled or transversely jointed. Seeds destitute of albumen. This order includes nearly 200 genera and 1,200 species, occurring in all parts of the world, and extending to the polar limits of flowering plants, but especially abundant on the borders of the Mediterranean Sea. It is one of the most important to the vegetable gardener, including as it does the many varieties of cabbage, broccoli, turnip, radish,

cress, sea-kale, etc., and nearly all its members are anti-scorbutic. It is, moreover, not lacking in ornamental plants, especially in fragrant flowering species.

§ 1. *Pod continuous, usually much longer than broad, dehiscing throughout its whole length, or transversely jointed, not compressed at right angles to the partition.*

1. MATTHĬOLA.

This genus includes all the different races of Stocks. Its distinctive characters are: entire or sinuate leaves, large flowers, the petals having long claws, a nearly cylindrical pod, connivent stigmas thickened or horned at the back, and thin flat numerous seeds. About thirty species, chiefly from the Mediterranean region. Named after an Italian physician.

1. *M. incàna.*—This is the sub-shrubby biennial species from which the Brompton and perhaps the Queen Stocks have descended. It is an erect hoary plant, 1 to 3 feet high, with oblong-lanceolate entire leaves and large white, crimson, violet, purple double or single flowers. *M. fenestràlis*, Giant Cape Stock, is referred to this species by some authors. A native of the West of Europe and the Levant, and also found on cliffs in the Isle of Wight.

2. *M. ánnua.*—The Ten-week, Intermediate, and other garden annual varieties of Stocks belong to this species. This has produced innumerable varieties, from pure white, lilac, violet, rose, and crimson to purple. Mediterranean region.

3. *M. Grăca.* The Wallflower-leaved Stock.—The foliage of this, instead of being hoary and downy, is of a bright green, closely resembling that of the Wallflower. This includes some white and yellow annual varieties. South of Europe.

4. *M. bicórnis.*—A straggling annual with lilac flowers, very fragrant at night, but closed during the day. It has a two-horned pod. It flowers during the Summer months. South of Europe.

2. CHEIRÁNTHUS.

Herbs or undershrubs with bipartite hairs. Leaves entire or toothed. This genus differs very slightly from the last, distinguished by having a more flattened pod, wingless seeds, and a capitate or bilobed stigma. There are about a dozen species, chiefly from the Mediterranean, and extending to the Himalayas and North America. Name from χειρὸς, the hand, and ἄνθος, a flower; application uncertain.

1. *Ch. Chèiri* (fig. 33). Wallflower.—This needs neither de-

scription nor recommendation. The varieties it has given birth to are innumerable. Yellow, orange, purple, brown, and variegated single and double flowers occur. The Rocket Wallflowers form a distinct race, with long narrow flower-spikes. Though probably not indigenous, it is now found in many parts of Britain. The figure is more characteristic of the wild than the cultivated form.

2. *Ch. Marshállii*, syn. *Erýsimum.*—A dwarf shrubby plant with evergreen leaves and a profusion of large fragrant orange-coloured flowers. It continues in flower from April till July. Supposed to be of hybrid origin, between the common Wallflower and *Ch. alpìnus.*

3. *Ch. alpìnus.*—A dwarf species about 6 inches high, with remotely toothed leaves and an abundance of pale yellow flowers. Summer. Mountains of Europe.



Fig. 33. Cheiranthus Cheiri. (½ nat. size.)

3. ÁRABIS.

Annual or perennial herbs, often with large rosettes of leaves, glabrous or hairy. Radical leaves spathulate, cauline sessile. Flowers white, more rarely purple. Pod linear, compressed, keeled, not elastic; seeds compressed in 1 or 2 series. Species numerous, chiefly from the temperate and arctic regions of the northern hemisphere. The name is from *Arabia*, the native country of some species.

1. *A. álbida*, syn. *A. Caucásica.*—Very common in old gardens, and a very hardy Spring flowering plant. It grows in patches with slender running stems and rosettes of pale green spathulate toothed leaves clothed with greyish hairs. Flowers pure white, in elongating racemes on leafy erect stems. There is a very pretty variegated variety. Mediterranean region, etc. *A. alpìna* is probably an alpine form of this species.

2. *A. blepharophýlla.*—Similar to the preceding in habit and foliage, but with rosy-purple flowers. From California, but not yet very widely spread in gardens. June.

3. *A. lùcida.*—This species has dense rosettes of glabrous shining sessile spathulate leaves and very small white flowers.

The variegated form is very beautiful, and now very extensively used for edging. A native of Hungary, flowering in the month of June.

A. Androsàce and *A. procúrrens* are very small alpine perennials with white flowers; and *A. vérna* is a pretty annual with blue flowers.

4. CARDAMÍNE.

Usually glabrous plants having pinnate leaves and white, lilac or purple flowers. It differs from *Arabis* in its pod being indistinctly keeled, with elastic valves. There are about fifty species, spread over the cold and temperate regions of both hemispheres. The name is derived from *κάρδαμον*, cress.



Fig. 35. Lunaria biennis. (¼ nat. size.)



Fig. 34. Cardamine latifolia. (¼ nat. size.)

1. *C. praténsis.* Lady's Smock or Cuckoo Flower.—A pretty though exceedingly common indigenous early-blooming perennial, with lilac or white flowers, of which there is a double variety in cultivation, occasionally found wild in wet situations.

2. *C. latifòlia* (fig. 34).—A tall-growing Spanish species with purple flowers, appearing in June. It inhabits swampy places.

3. *C. trifòlia.*—A distinct little plant, about 9 inches high, with glabrous trifoliate leaves and dense corymbs of small pure white flowers. A native of Switzerland, flowering in Spring.

5. LUNÀRIA.

Biennial or perennial pilose herbs with erect branching stems and cordate simple dentate petiolate leaves and terminal racemes of purple flowers. This genus is remarkable for the oval or oblong compressed stipitate siliquas, whose transparent silvery partition is persistent after the valves have fallen away. Only two species are known; natives of Central Europe and Western Asia. Name from *luna*, the moon, the shape of the seed-vessel.

1. *L. biénnis*, syn. *L. ánnua* (fig. 35).—This is the plant familiarly known as Honesty. A biennial, from 2 to 3 feet high, with large purplish-violet flowers. There is also a white variety. May to July.

2. *L. rediviva.*—A perennial species, not so pretty as the above, with smaller pale blue flowers and a smaller seed-pouch.

6. AUBRIÈTIA.

A genus of small dwarf trailing hairy herbs with small entire or toothed leaves and rather large purple flowers. In character it is very close to *Alýssum*, with the exception of the lateral sepals being saccate at the base. There are about six species known, from the Mediterranean region. Named in honour of a French botanical draughtsman.



Fig. 36. Aubrietia deltoidea. (½ nat. size.)

1. *A. deltoìdea* (fig. 36).—There are several varieties of this, differing in the size and brilliancy of their flowers from the typical plant. The best one in cultivation is that named *Campbéllii*, which is much larger in the flower, and apparently a freer bloomer. *A. purpùrea*, of larger stature, with larger deeper violet flowers, is held by some to be a distinct species, including *Campbéllii*, *grandiflòra*, and *Grǽca*. They all flower in Spring.

7. ALŸSSUM.

Annuals or dwarf branching shrubby perennials, often clothed with hoary stellate hairs. Leaves distant, or the radical ones tufted, usually entire. Flowers small, white or yellow. Sepals equal. Petals entire or bifid. Filaments sometimes appendiculate. Pods short, variable in shape; seeds 2 to 10. About ninety species are known, chiefly from the shores of the Mediterranean. The name is said to be derived from *ἀ*, privative, and *λύσσα*, madness, in allusion to the fabulous properties attributed to the species; hence the English Madwort.

1. *A. saxátile* (fig. 37).—A low shrubby branched perennial with whitish foliage and flowers of the brightest yellow. A common plant in cultivation, growing in dense tufts about



Fig. 37. Alyssum saxatile. (⅓ nat. size.)

a foot high, with close corymbs of small flowers. One of our handsomest early Spring flowers. *A. Gemonénse* is closely allied to this, and perhaps a variety of it, but it is a more vigorous and larger plant altogether. South of Europe.

2. *A. marítimum*, syn. *Koníga marítima.*—A much-branched procumbent plant with slender wiry branches, less than a foot high, and small linear-lanceolate leaves, and small white flowers. The variegated form is very pretty, and extensively employed for edging, etc. Europe, Asia Minor.

8. HÉSPERIS.

Erect biennial or perennial herbs with simple, forked or glandular hairs. Leaves scattered on the stem, ovate or oblong, entire or toothed or lyrate. Flowers rather large. Sepals erect, lateral ones saccate at the base. Petals clawed. Stamens free. Pod angular or compressed; valves keeled; seeds in a single row. About twenty species, from Europe, Asia Minor, Persia, and Siberia.

1. *H. matronàlis*, including *H. inodòra* and *H. Sibírica*. Dame's Violet, or Rocket.—From 2 to 3 feet or more high. Leaves ovate-lanceolate, dentate. Flowers odoriferous in the evening, purple, red, or white, or variegated. Pod contracted between the seeds. This plant, a native of the South of Europe, has long been cultivated, and many beautiful varieties have been obtained, including double-flowered in all of the above-mentioned colours. May to August.

9. SCHIZOPÉTALON.

Annual erect herbs with branching hairs and alternate dentate pinnate or pinnatifid leaves and purplish or white flowers. This may be known from all other *Crucíferæ* by its pinnately lobed petals and bracteate racemes. About six species are reported, all from Chili. The name is from σχίζω, to cut, and πέταλον, a petal.

1. *S. Wálkeri.*—A hardy annual about 2 feet high with small fragrant white flowers.

10. MALCÓLMIA.

The Virginian Stock is the only member of this genus we need occupy ourselves with. In technical characters the genus comes very near *Hésperis*, differing in having a roundish pod thickened at the base and a subulate stigma. About twenty species are known, inhabiting the countries bordering the Mediterranean and Caspian seas. A commemorative name.

1. *M. marítima.* Virginian Stock.—A pretty dwarf hardy annual with lilac, rose, red, or white flowers. A pigmy variety has recently been raised, a compact little plant, producing abundance of pure white flowers. This species is a native of the South of Europe.

11. ERŸSIMUM.

Tall biennial or perennial herbs with narrow entire leaves and yellow or orange flowers. Lateral sepals saccate at the base. Pod elongated, roundish or 4-angled; seeds not winged, oblong, in one row. Europe, Asia, and North America. Name from ἐρύω, to draw blisters.

1. *E. Peroffskiànum.*—This showy annual is a great favourite on account of its deep reddish orange-coloured blossoms and neat habit. From the Caucasus. *E. ásper*, syn. *E. Arkansànum*, is similar to the last, but with lemon-coloured flowers. *E. Marschalliànum* is another Caucasian species, with bright yellow flowers.

12. BRÁSSICA.

We introduce this genus merely to notice the varieties with ornamental foliage, imported some years ago from China. Their habit recalls somewhat that of a palm, all the leaves being tufted on the summit of a tall simple stem. But it is the form and colour of the leaves that gives them their greatest charm. The leaves are variously cut, dissected, feathered, frilled, and curled, and exhibit every shade of rose and violet purple, and in some varieties variegated with white.

§ 2. *Pod nearly or quite as broad as long, dehiscing throughout its whole length, and compressed at right angles to the septum or partition.*

13. IONOPSÍDIUM.

Miniature glabrous annuals. Leaves sessile or petiolate, spathulate or orbiculate, entire or 3-lobed. Flowers small, white, violet, lilac, or flesh-coloured, on long peduncles. Sepals spreading, equal at the base. Stamens free. Pouch broadly oblong, laterally compressed, with 2 or 3 seeds in each cell. Only two species are known.

1. *I. acaùle.*—An exceedingly pretty little plant, not more than 3 inches high. Flowers lilac, or white tinged with violet. Native of Portugal.

14. IBÈRIS.

Annual or herbaceous or shrubby diffuse perennials. Leaves entire or pinnatifid, often fleshy. Flowers racemose or corymbose, white or purple. Sepals equal at the base. Petals un-

equal; the two exterior larger than the others. Stamens free. Pod broad, compressed, ovate or orbicular, entire or bifid at the apex; seeds one in each cell, not margined. About twenty species are known, nearly all inhabiting the Mediterranean region. Named from *Iberia*, Spain, where many species grow. They are all known under the English name of Candytuft.

1. *I. amàra* (fig. 38).—An annual plant from 6 to 9 inches high, with white or purplish flowers about half an inch across, appearing in July. Western Europe, naturalised in England. As the specific name denotes, very bitter.

2. *I. umbellàta*.—Also annual, and rather larger than the preceding, with flowers arranged more in the form of an umbel or corymb. It is



Fig. 38. Iberis amara. (½ nat. size.)



Fig. 39. Iberis sempervirens. (½ nat. size.)

the commonly cultivated annual species, with white, lilac, purple, or crimson flowers.

3. *I. odoràta.*—A pretty odoriferous annual species, a foot or more high, with large corymbs of pretty white flowers towards the end of Spring. A native of Crete.

4. *I. sempervìrens* (fig. 39).—A shrubby branching evergreen species, about 9 inches or a foot high, with pure white flowers. This is the ordinary perennial species in cultivation, flowering in May. A native of Candia (hence the trivial name Candytuft), and other parts of Southern Europe.

5. *I. Garrexiàna.*—A common plant in cultivation, very near No. 4, and by some considered a variety of it. The flowers, however, are smaller, and the racemes elongate very much in the course of flowering. It is a very hardy kind, a native of the South of Europe, flowering in Spring.

6. *I. semperflòrens.*—Shrubby, and similar to the last, but double its size, and flowering in Autumn and Winter. From the Levant.

7. *I. Gibraltàrica.*—This is a magnificent species, bearing the largest flowers in the genus. It grows about a foot or more high, with oblong-spathulate leaves and pinkish-lilac or nearly white flowers. Native of the South of Spain, and still scarce in this country.

8. *I. Prùiti.*—The flowers of this nearly equal those of the last-named species, but here they are pure white. A somewhat shrubby plant, rarely exceeding a foot in height, producing an abundance of dark green foliage and compact heads of flowers, which appear in May or June. It is from the South of Europe.

9. *I. Tenoreàna.*—Near Nos. 6 and 7, but hairy all over, and the flowers, white at first, change to a purplish red. South of Europe.

15. ÆTHIONÈMA.

A small genus of herbaceous or shrubby perennials, distinguished by the filaments of its four longer stamens being winged and furnished with a tooth, equal petals, and boat-shaped or spoon-like pods with usually numerous seeds. From the borders of the Mediterranean and Persia. Name from *αἴθων*, bright or flaming, and *νήμα*, a thread, in allusion to the filaments of some species.

1. *Æ. coridifòlium.*—A dwarf hardy plant, shrubby below, with erect stems 6 to 8 inches high. Leaves linear, glaucous. Flowers small, rosy lilac, in terminal dense rounded racemes. A very pretty plant, native of Palestine, flowering in June and July.

2. *Æ. jucúnda.*—Similar to the above, and from the same country, and probably only a variety of it. It is of smaller stature, and the flowers have more of a carmine tinge in them.

Order X.—CAPPÁRIDEÆ.

Herbs, shrubs, or trees. Leaves usually alternate sometimes digitate; stipules usually present, and occasionally spinescent. Sepals 4, rarely more. Petals 4, very seldom more, rarely none. Stamens often many, and when few never tetradynamous. Ovary 1-celled, with several placentas, often on a long stalk. Seeds numerous. Albumen none or very thin. A large order, inhabiting the warmer and tropical regions of both hemispheres.

1. CÁPPARIS.

A genus of about 120 species, chiefly tropical. The following is the only one seen in cultivation in the open air in this country, and that is tender. The name is of Arabic origin.

1. *C. spinòsa.* Caper-bush.—A half-hardy deciduous spiny straggling shrub with simple leaves and white flowers tinged with pink. Sepals and petals 4; stamens numerous. The fruit is a berry, elevated on a long stalk, containing numerous seeds. The flower-buds are the Capers of our tables. This is occasionally grown as a curiosity. It is a native of the Mediterranean region.

2. CLEÒME.

This is a very large genus of the warmer and tropical regions, containing some shrubby and many annual species of some beauty, a few of which are cultivated. The distinctive characters of the genus are: sepals and petals 4, stamens 6, and a 1-celled capsular fruit with many seeds. Leaves simple, or digitately 3- to 7-foliolate. Flowers solitary or racemose,

showy, white, yellow, or purple. The etymology of the word is obscure.



Fig. 40. Cleome spinosa. (½ nat. size.)

1. *C. spinòsa* (fig. 40).—This is a handsome shrub from South America, remarkable for the length and persistence of its stamens. Petals rosy pink, all directed upwards. A tender species.

2. *C. ròsea.*—A beautiful annual about 18 inches high. Leaves glabrous, petiolate, 3- to 5-foliolate, with the uppermost simple; leaflets lanceolate. Flowers bright rose, in terminal bracteate racemes. South America.

3. *C. speciosíssima.*—Near the last, but with 5- to 7-foliolate hairy leaves and larger violet-red flowers. Mexico.

Order XI.—RESEDÀCEÆ.

Annual or perennial herbs, rarely shrubby. Leaves scattered or fasciculated, simple, trifid or pinnate; stipules minute, glandular. Flowers hermaphrodite, small, dull-coloured, racemose, or spicate. Calyx persistent, 4- to 7-partite, equal or unequal, lobes imbricated. Petals 4 to 7, rarely 2 or none, hypogynous, deeply lobed or laciniate. Torus dilated upwards. Stamens 10 to 40, inserted within the torus. Capsule sessile or stalked, indehiscent, open at the top in three lobes. Seeds numerous, reniform, exalbuminous. Most of the species belonging to this family are from the Mediterranean region.

1. RÉSEDA.

The characters as above. There are several species occasionally seen in cultivation, but none of them have much to recommend them except the fragrant species. Name from *resedo*, in allusion to its reputed medicinal qualities. There are two native biennial species, *R. Lutèola*, Weld, and *R. lùtea*, the former with entire, and the latter with lobed leaves.

1. *R. odoràta*, Mignonette.—This favourite plant is too well known to need description. It is believed to have originally come from Asia Minor or Egypt. As an out-door plant it is annual with us, but in the south and grown under glass it is perennial, though of short duration. There are several improved varieties in cultivation.

Order XII.—CISTÌNEÆ.

Dwarf, trailing, or erect shrubs with opposite or alternate simple usually entire leaves with large or small or no stipules and solitary or racemose showy ephemeral flowers. Flowers regular. Sepals 3 to 5, imbricate, the two outer usually smaller or absent. Petals 5, scarcely clawed, imbricate, spreading, very thin and fugacious. Stamens many, hypogynous; filaments free, filiform. Capsule 1-celled, or several-celled in consequence of the projecting parietal placentas; seeds numerous, albuminous, orthotropous. Chiefly from the Mediterranean region; a few dispersed throughout Europe, and a few found in North and South America, and Central and Eastern Asia.

1. HELIÁNTHEMUM.

Prostrate trailing herbaceous perennials or undershrubs. Flowers usually racemose. Valves and placentas of the capsule 3. About thirty species are known. The name is derived from ἥλιος, the sun, and ἄνθεμον, a flower. Some species have dimorphic flowers, similar to the violet. They are only suitable for rock-work. Besides *H. vulgàre* there are three other indigenous species: *H. guttàtum*, an annual, flowers yellow with a red eye; *H. cànum* and *H. polifòlium*, trailing shrubby species, the first with small yellow flowers, and the latter white.

1. *H. Algarvénse*, syn. *H. ocymoìdes*.—This is an erect-growing species about 2 feet high, more like a Cistus, to which

genus it is sometimes referred. Leaves ovate-lanceolate, sessile, very hairy. Flowers bright yellow with a brown blotch at the base of each petal. A Summer-flowering plant from Portugal.

2. *H. vulgàre*, Rock Rose.—This is the common native species, frequently seen in gardens, and one of the most widely distributed, being found from Arctic Europe to both shores of the Mediterranean. A dwarf shrub with opposite linear-oblong hairy leaves and usually yellow flowers, but varying in different shades to deep red. There is also a double-flowered variety. *H. cròceum*, *ròseum*, *surrejànum*, *grandiflòrum*, etc., are simply varieties of this species.

There are numerous other species, few of which are seen in cultivation; but we might mention *H. pulveruléntum* and *H. macránthum*, with white flowers; *H. formòsum* and *H. Tuberària*, an herbaceous species with ribbed leaves and yellow flowers with a purple blotch at the base of each petal.

2. CÍSTUS.

Mostly handsome erect shrubs from Western and Southern Europe, North Africa, and the Atlantic islands. Leaves opposite, entire or toothed, oblong or lanceolate. Flowers large and showy, but very evanescent, and not opening in dull weather. Sepals 3 to 5. Petals white with a yellow or purple blotch at the base, or rose with a yellow spot at the base, never wholly yellow. Technically distinguished from *Helián-themum* by the capsule being usually 5-valved, and the flowers cymose or solitary, seldom racemose. Etymology from the Greek name *κίστος*. Some of the species are tolerably hardy in the South of England.



Fig. 41. Cistus ladaniferus. (⅓ nat. size.)

1. *C. ladaníferus* (fig. 41).—This has sessile 3-nerved lanceolate leaves, glutinous above, and covered with a

dense white tomentum beneath, and large white flowers with a purple blotch at the base of the petals. Native of Portugal, flowering in June. There are several varieties of it.

2. *C. Cỳprius.*—Perhaps even commoner than the preceding, and often confounded with it. This has large solitary flowers and petiolate leaves, whilst in the former the flowers are borne in clusters of three or four on a common stalk, and the leaves are sessile.

3. *C. laurifòlius.*—This is one of the hardiest species in cultivation, having petiolate 3-nerved ovate-lanceolate viscous leaves densely tomentose beneath, and white flowers. A robust growing shrub 6 or 7 feet high.

4. *C. salvifòlius.*—A very variable species of slender habit. The variety generally met with in cultivation has ovate-lanceolate acute rugose nearly glabrous leaves on slender petioles, and medium-sized white flowers. A distinct species, about 3 or 4 feet high.

5. *C. purpùreus.*—Leaves oblong or lanceolate, rugose, strongly veined, shortly petiolate, densely pubescent beneath. Flowers terminal, large reddish purple, with a dark blotch at the base of each petal. This is not so hardy as some of the foregoing.

6. *C. Monspeliénsis.*—A very variable plant in the foliage, with small white flowers having yellow blotches about an inch in diameter. Young parts hairy and clammy. Leaves sessile, 3-nerved, strongly veined, linear or lanceolate, obtuse or acute.

7. *C. populifòlius.*—A very distinct species of large stature with ovate-cordate acuminate rugose leaves on long petioles, and medium-sized white flowers tinged with yellow at the base of the petals. Pubescence slight, viscous. Flowers in lateral cymes.

Order XIII.—VIOLÀRIEÆ.

Herbs or shrubs. Leaves alternate, rarely opposite, simple, entire, seldom laciniate, stipulate. Flowers axillary and solitary, or cymose, paniculate, or racemose. Pedicels commonly furnished with two bracts. A large order distributed over the whole world. Only one genus need occupy our attention, and therefore we content ourselves with giving its technical characters alone.

1. VĬOLA.

Annual or perennial, rarely somewhat shrubby herbs. Leaves alternate, with persistent often foliaceous stipules. Peduncles axillary, usually one-flowered. Many species produce dimorphous flowers. The Spring flowers are usually sterile, and the small apetalous Summer ones fertile. Sepals nearly equal, produced downwards below the point of insertion. Petals spreading, the lower often larger and spurred or saccate at the base. Anthers subsessile, the connective broad with a membranous terminal appendage, the two lower stamens often spurred. Capsule 3-valved, with 3 parietal placentas, opening with elasticity. Seeds numerous, albuminous ; testa crustaceous, often shiny. A genus of about a hundred species, very widely distributed, the majority in the northern hemisphere. The name is the ancient Latin one for plants of this genus.

§ 1. MELÀNIUM. *Upper petals erect. Stipules large and leaf-like.*

1. *V. trìcolor.*—Heartsease or Pansy (fig. 42). Even in the wild state the forms of this species, as usually defined, are very



Fig. 42. Viola tricolor, var. (½ nat. size.)

numerous. The commoner ones are *arvénsis* and *trìcolor* proper ; the former with yellow or white petals scarcely exceeding the sepals, and the latter with larger purple and yellow petals. Another form is *lùtea*, by some botanists considered as specifically distinct. This has medium-sized flowers,

normally yellow, with a few dark purple stripes. It is a native of the mountainous districts of Britain and the Continent, and will not succeed in dry hot situations. It is uncertain whether the Pansies of our gardens have sprung from this species alone, or whether *V. altaìca* and *V. Rothomagénsis* have been intercrossed with it to produce them; but from the experiments of various horticulturists it would appear that the former is the more probable source of their origin. Indeed, some are inclined to consider these 'species' as races of *V. trìcolor*. However that may be, there is no doubt of the wondrous diversity and beauty of the cultivated varieties, ranging in colour from white, yellow, lilac, violet, and purple in different tints to nearly black, and others in which there is some combination of these colours. There is no longer the same rage as formerly for the named varieties, though some of the self-coloured ones are now extensively employed for massing. Pansies have long been cultivated; but Lady Mary Tennet, about the year 1812, assisted by her gardener Richardson, was the first to devote attention to the selection of fine varieties.

2. *V. calcaràta.*—A dwarf free-blooming species with numerous underground creeping stems. Leaves crenate, ovate or oblong-lanceolate; stipules entire, 3-toothed, or pinnatifid. Spur as long as the petal, slender. Flowers large, pale blue. A variety called *V. Zóysii* has smaller yellow flowers. Switzerland.

3. *V. cornùta.*—Closely allied with the foregoing, but having broader less deeply crenate leaves, and of more erect growth. The stipules are not so deeply divided, and the flowers are of a darker blue. A native of the mountains of Europe.

There are several varieties in cultivation which are referred to this species, and valuable on account of their profusion of flowers.

§ 2. Nomímium. *Upper petals projecting forwards. Stipules not leafy.*

V. odoràta. Sweet Violet.—This species is too well known to need description. It is the only one of this section in general cultivation. The varieties are numerous, double and single, violet, white, and mottled with the two colours, and some of them bloom nearly all the year round. The variety called the *Czar* is one of the best, producing its long-stalked large blue fragrant flowers in the greatest profusion during

the latter part of Winter and early Spring. The Neapolitan, Giant, and King are varieties of this species. This is indigenous in the South-east of England.

V. palmàta, *V. pedàta*, and *V. pinnàta* are all handsome blue or, in some varieties, white-flowered species, having the leaves divided into narrow segments in the manner suggested by the several names. The first two are North American, and the other South European.

Order XIV.—PITTOSPÒREÆ.

Shrubs or small trees, or more rarely climbing or trailing shrubs. Leaves alternate, usually simple, exstipulate. There are two or three species of the genus *Pittospòrum* hardy or nearly so in the South-west of England. The majority of the species are Australian.

1. PITTOSPÒRUM.

Sepals distinct or connate at the base. Petals cohering more or less, or spreading from the base. Stamens 5; filaments subulate. Capsule sessile, 2- or more celled, globose, ovate or obovate, often laterally compressed; valves coriaceous or woody. Seeds numerous, fleshy, albuminous, often enveloped in a viscid juice. About fifty species are known, from Africa, the warmer parts of Asia, Pacific Islands, Australia, and New Zealand. The name is from *πίττα*, pitch, and *σπορά*, seed, in reference to the resinous envelope of the seeds. None of the species are quite hardy, even in the South-west, though some of them will bear our ordinary winters without injury.

1. *P. Tobìra.*—A handsome evergreen shrub. Leaves glabrous, oblong or obovate, entire, coriaceous, and glossy. Flowers white, in terminal clusters, fragrant. China.

P. undulàtum, *P. Sinénse*, and *P. coriàceum* are the names of other species in cultivation. The former is from Australia, has pale green wavy leaves with a dark midrib, and is the most desirable for planting out in sheltered places.

Idèsia polycárpa forms a genus of *Bixìneæ*, and has lately been introduced. It is a large tree with large alternate glabrous cordate remotely serrulate acuminate leaves on long petioles, and terminal panicles of inconspicuous flowers, succeeded by large pendent clusters of purplish-black berries. It is cultivated in Japanese gardens, whence it was imported.

Order XV.—POLYGÀLEÆ.

Herbs or undershrubs, often climbing or trailing. Leaves alternate, rarely opposite, exstipulate, simple, and usually entire. Flowers hermaphrodite, irregular, solitary, spicate or racemose. Sepals 5, free, imbricated, the two innermost larger, petaloid. Petals 3 or 5, hypogynous; the 2 outer free, or united with the hooded lower one forming a tube split at the posterior base, the 2 inner equal or smaller or absent. Stamens 8; filaments connate in a tube, and united with the petals below. Capsule 2-celled, compressed, dehiscing loculicidally. Seeds pendulous, hairy or glabrous, often strophiolate, with or without albumen.

1. POLÝGALA.

The character as above. A genus of nearly 200 species, dispersed nearly all over the world. The hardy species are not numerous, and by no means so showy as many of the tenderer kinds from the Cape of Good Hope. Name from *πολύς*, much, and *γάλα*, milk. This is variously explained.

1. *P. vulgàris.* Common Milkwort.—An indigenous and very variable species according to soil and situation. Under cultivation the numerous slender prostrate or erect stems usually grow about a foot long. Leaves small, oblong or lanceolate, glabrous. Flowers about 4 to 6 lines long, in terminal racemes, blue, lilac, purple, pink, or white.

2. *P. Chamæbùxus.*—A larger handsomer shrubby plant. Leaves small, ovate, coriaceous, persistent. Flowers fragrant, yellow and cream. A native of Switzerland and Austria. May to July.

Order XVI.—FRANKENIÀCEÆ.

A small group of erect or trailing littoral and desert plants with very small opposite leaves and small flowers. They differ technically from the gamosepalous *Caryophýlleæ* in having parietal placentas.

1. FRANKÈNIA.

The only genus of the family, consisting of about twelve species. Named in honour of a Swedish botanist.

1. *F. lævis.* Sea Heath.—A native species with pink flowers, growing in dense patches, and very pretty when in full bloom. There are several other hardy species, none of them very showy.

Order XVII.—CARYOPHÝLLEÆ.

Annual or perennial herbs, sometimes woody at the base, often enlarged at the joints. Leaves opposite, entire, with or without stipules. Flowers regular, hermaphrodite, more rarely unisexual by abortion, often in dichotomously branched cymes. Sepals 4 or 5, persistent, free or cohering in a tubular calyx, imbricate. Petals of the same number as the sepals, either hypogynous or perigynous, entire or bifid or fringed. Stamens 8 to 10 or fewer, inserted with the petals. Torus usually small. Styles 2 to 5. Capsule 1-celled, or rarely 2- to 5-celled at the base, membranaceous or crustaceous, dehiscing in valves or at the top, rarely transversely. Seeds numerous, amphitropal, albuminous, often reniform, embryo curved. Species very numerous; especially abundant in the temperate zone of the northern, but extending to the utmost plant limit in the frigid zones of both hemispheres.

Tribe I.—*SILÈNEÆ.*

Sepals united, forming a 4- or 5-lobed tubular calyx. Disk elongated, bearing the petals and stamens.

1. DIÀNTHUS.

The presence of two or more bracts at the base of a tubular calyx and peltate seeds with a straight embryo are the principal distinctive characters. The numerous species are dispersed across Europe, North Africa, and Central Asia, from the borders of the Atlantic to the eastern extremity of China and Japan, and one species is found in North-west America. The species are particularly numerous in the Mediterranean region, and about four extend to Britain. The name is derived from the two Greek words *δῖος* and *ἄνθος*, literally Jupiter's flower. We must limit ourselves to a review of those species more directly interesting from a horticultural point of view.

1. *D. Caryophýllus.*—The parent of all the beautiful florist's varieties known under the names of Carnation, Picotee, Clove,

etc. It is a native of the Mediterranean region, but it has become naturalized in many localities farther north. According to some authors, the Carnation was cultivated in very ancient times by the Mussulmans of Africa, who used it to perfume their liqueurs, and was brought from Tunis during the latter half of the thirteenth century, upon the termination of the disastrous expedition undertaken by St. Louis against that town. But there is nothing to prove that it is any more indigenous in Barbary than it is on the northern shores of the Mediterranean. Moreover, the history of this plant is neither more nor less obscure than that of many other cultivated plants of early introduction. Under cultivation the normally single flower has become semi-double or double in all degrees, and, in place of the uniform lilac purple of the wild state, it has assumed all hues, from pure white to dark purple and almost black, and even some which seem quite foreign to it, as yellow and certain slate-coloured tints, in which some profess to distinguish shades of blue. These colours are varied and intermixed in a thousand ways upon a ground of the dominating tint, giving rise to striped, flaked, spotted, bordered, bi- or tri-coloured double or full flowers, with petals fringed or entire, realising almost every imaginable combination of form and colour.

Every country of Europe, but principally Holland, Belgium, Germany, France, and England, has participated in the cultivation of the Carnation, and each of these countries has produced a series of varieties, more or less distinct, which they have attempted to classify systematically; but these classifications, made without any common understanding, and resting almost all of them upon the whims of some amateurs, have augmented rather than diminished the confusion. We think we cannot do better than give an outline of those classifications which have received the greatest number of adherents in this branch of floriculture. According to the English classification, all the varieties of the Carnation are brought under three categories, viz.: Bizarres, Flakes and Picotees. The Bizarres are distinguished by their white ground, rayed or striped from the centre to the circumference, with bands of two or three clearly defined different colours or different tints of the same colour. The Flakes have also a white ground, but they are only striped or streaked with one colour. And Picotees, instead of having the petals longitudinally striped, have them bordered

with a different colour from the white or yellow ground, sometimes with the limb spotted or marked with the same or a different colour. In England, it appears, little importance in classification is attached to the presence or absence of fringe at the extremity of the petals.

In France also Carnations are usually divided into three principal classes, which, however, are founded upon different characters. They are *Grenadins*, *Flamands*, and *Fancies*. The Grenadins are cultivated almost solely for the perfumes they afford. The flowers are of medium size, single or double, fringed, unicoloured, deep purple, violet, or verging upon chestnut brown, all exhaling a grateful odour. The Flamands (fig. 43) have large more or less double very round flowers, raised or convex in the centre, with the petals quite entire and unicoloured, or banded longitudinally with two or three distinctly defined colours or tints upon a white ground. The Fancies are subdivided into *German* and *English*, with the petals either toothed or not, but marked or striped with two or three different colours upon a yellow ground of various shades in the former, and wholly white in the latter. It will thus be seen that the English Picotees belong to the French Fancies, and the Flakes and Bizarres with entire petals to the Flamands.



Fig. 43. Dianthus Caryophyllus, Bizarre variety. (½ nat. size.)

A fourth class, called Proliferous Carnations, was formerly cultivated, but plants of this class are now usually discarded. They are so excessively double that the buds split up one side instead of opening regularly, thus giving the flower a very ragged and untidy appearance.

The Flamands are so numerous, and for the greater part so ephemeral, that it would be quite superfluous to enumerate them here. The merit of discovering the Perpetual Carnation is due to a French gardener, M. Dalmais, of Lyons, and since then many varieties possessing this unexpected quality have been raised by various horticulturists.

D. fruticòsus is usually considered as a variety of the foregoing species. The Tree Carnations and most of the perpetual varieties come under this sub-species. The stems are half-woody at the base, and rise to a height of 3 to 6 feet when supported. The varieties are now becoming numerous, but they are more valuable for winter flowering under glass than for the flower garden. It is said to be of Eastern origin and a wild form. In the French edition this is held to be distinct from *D. Caryophýllus*.

2. *D. plumàrius*. Pink.—A much dwarfer plant than the foregoing, forming dense grass-like tufts of a glaucous tint, and therefore well adapted for edging. Its flowering season commences about the middle or end of May, and is of about a month's duration. There are many varieties of it, mostly very fragrant, both double and single, white, rose, bright carmine, and some are laced or bordered with carmine or lake on a rose or white ground. For pot culture preference is usually given to the white varieties or those bordered with purple on a white ground. It is a native of the South of Europe.



Fig. 44. Dianthus barbatus. (⅓ nat. size.)

3. *D. barbàtus* (fig. 44). Sweet William.—This is indigenous in the central and western Pyrenees and other parts of Europe. It is readily distinguished from the preceding species by its broader oblong-lanceolate leaves alone, and also by the relative smallness of its flowers, which by way of compensation are borne in dense corymbs. The date of its introduction to our gardens is so remote that it is difficult to find its origin in the old authors; but one thing is certain, that it is only within the last fifty years that the

beautiful varieties now cultivated in our gardens began to arrive from Germany and Russia. Since then they have been considerably increased, and we might now enumerate upwards of a hundred, both double and single, and comprehending every shade and combination of colour from white and pink to dark purple.

4. *D. Hispánicus.* Spanish Pink.—A charming variety of the Sweet William. It has rather broad leaves, erect stems, and dense inflorescence; but its flowers are at least three times the size of the common varieties. Their normal tint is a lilac carmine, with a circle of dots of a deeper colour around the centre. This colouring is greatly modified under cultivation, and varieties are now known some quite white, others rose or carmine, and others again marbled with pink or carmine upon a white ground. And it is not an unusual occurrence to meet with all these varieties of colouring in the same individual; hence, doubtless, its French name of *Œillet badin*, or Sportive Pink. Only the semi-double and double varieties are generally seen in gardens, and even they are not very widely spread at the present time, though they have long been in favour. In the French edition this is given as a distinct species; but the true *D. Hispánicus* is a totally different plant, belonging to another section of the genus.



Fig. 45. Dianthus Chinensis. (½ nat. size.)

5. *D. Chinênsis* (fig. 45). Chinese Pink, or Indian Pink.—Brought from China early in the eighteenth century by a French missionary named Bignon, it soon became as popular as the other species of this genus. It is distinguished by its narrower more acute glaucous leaves and its incomparably larger flowers, which in some varieties are truly enormous. This, like all the other species, has been remarkably improved under culture, and has given birth to a multitude of both single and double varieties, self-coloured or streaked, white, pink, crimson, carmine, purple-

violet, &c. Among these varieties we may allude more particularly to those of Heddewig, introduced from Russia a few years ago by an amateur of that name, remarkable alike for the size of their flowers and the beauty of their colouring. They have been divided into two groups: the Giant varieties (*D. Chinénsis gigánteus*), in which the peduncles are usually one-flowered; and the Fringed varieties (*D. Chinénsis laciniàtus*), with the flowers always large and often double, and petals deeply jagged or torn, giving them an unusual appearance in the genus.

Following these species, though less known and less generally cultivated, we may cite the Superb Pink, *D. supérbus* (fig. 46), whose pink or carmine rather large flowers are fringed or deeply laciniated; the Virgin Pink, *D. virgíneus*; the Deltoid Pink, *D. deltoìdes*; the French Pink, *D. Gállicus*; and the Shining Pink, *D. fúlgens*, with crimson flowers: all natives of Europe, and which would doubtless produce many beautiful varieties with careful culture. *D. cæsius*, *negléctus*, and *arenàrius* are some of the best species for rockeries.



Fig. 46. Dianthus superbus. (¼ nat. size.)

Hybrid Varieties.—As in most genera rich in species, those of the genus *Diánthus* readily cross, and, although gardeners have not proceeded here with more order or method than they have with Roses, there are several varieties whose hybridity can scarcely be contested. This is particularly the case with the variety called *Flon*, a very beautiful perpetual variety, found, it is said, amongst some seedlings of the Sweet William by a gardener of Angers, M. Flon, and from which another gardener, M. Paré, has succeeded in raising some new varieties. It is supposed that the plant which furnished the seeds was fertilised by the Carnation, or rather by the Tree-Carnation, a

supposition suggested by the long duration of the flowering season of the species in question. This is invariably sterile, and the new varieties obtained from it—one white and one striped—were simply accidental sports, which have been perpetuated by propagation from pipings. Sterility, however, it should be observed, is not necessarily a proof of hybridity, because this is no infrequent consequence in double flowers. The Pink Flon is herbaceous and somewhat woody, forming thick spreading tufts, which throw up erect stems from a foot to a foot and a half high, terminated by large corymbs of double purple odoriferous flowers of medium size. It is very hardy.

An English gardener has described another hybrid, the issue of *D. fúlgens* impregnated by pollen from a double Carnation. This hybrid is remarkable for its immense corymbs of very double flowers of the most beautiful carmine. More recently, several French florists have offered a third hybrid for sale, the result, it seems, of a cross between *D. supérbus*, female, and a Japanese species, perhaps *D. Chinénsis*, male.

2. TŪNICA.

Small slender rigid herbs resembling small Pinks. They differ from *Diánthus* in the few-nerved calyx. About ten species are known, all inhabiting the Mediterranean region; but only one species is at all generally cultivated. The name is from the Latin, signifying a jacket or covering.

1. *T. Saxifràga*, syn. *Gypsóphila Saxifràga.*—A dwarf trailing plant with slender wiry stems and linear rigid leaves. The bright pink flowers are small, but being produced in copious panicles they are very effective. It is a native of the Pyrenees and Alps, and continues blooming all the Summer.

3. GYPSÓPHILA.

Elegant perennial often glaucous herbs with small usually flat leaves and very small paniculate flowers. The species of this genus are remarkable for their graceful habit and numerous small flowers on slender pedicels. The reniform seeds and curved embryo, together with the different habit and small often minute flowers, distinguish this from the allied genera. There are nearly fifty species described, mostly from the South of Europe. From γύψος, lime or chalk, and φιλέω, to love, because many of them grow in this soil.

1. *G. paniculàta.*—This is one of the best for bouquets and

other decorative purposes. It grows from 1 to 3 feet high and bears a great profusion of small white flowers. It is a very diffuse much-branched plant, succeeding best when treated as an annual.

2. *G. prostràta.*—A trailing species with narrow lanceolate glaucous leaves and pink flowers.

G. muràlis, *Stevèni*, *élegans*, *rèpens*, and *glaùca*, syn. *acutifòlia*, are similar species with white or pink flowers. The two first are of annual duration.

4. SAPONÀRIA.

Annual or perennial herbs, differing from the last genus in having the calyx constricted at the top and not membranaceous between the nerves, and from *Silène* in having only two styles, and especially in the obscure nervation of the calyx. There are about thirty species, chiefly from southern Europe and extra-tropical Asia. The name is from the Latin *sapo*, soap, from the properties of *S. officinàlis.*

1. *S. officinàlis.* Soapwort.—An erect glabrous rather stout perennial plant 2 to 3 feet high. Leaves oblong-lanceolate, about 3 inches long, 3-ribbed. Flower 1 inch across, pink or white, double or single, produced in terminal clustered cymes. This is found in some parts of England, but is not truly indigenous. There is a variety called *hỳbrida* having a monopetalous corolla.

2. *S. ocymoìdes.*—A dwarf densely-branched procumbent perennial species with ovate-lanceolate leaves and rosy purple or pink flowers. A very desirable little plant, producing its flowers in abundance nearly all the Summer. A native of Europe.

3. *S. Calábrica.*—This is of annual duration and one of the handsomest of that class of plants. It does not exceed a foot in height and its rosy-pink flowers though small are so numerous as to be highly effective. There is also a white-flowered variety. South of Europe.

5. SILÈNE.

A large genus of annual and perennial herbs of variable habit. Flowers terminal, solitary, cymose, paniculate, or in one-sided spikes. Calyx more or less inflated, 5-toothed, 10-nerved. Petals 5; claws narrow; blade entire or divided, often with two scales at its base. Stamens 10. Styles 3.

Capsule 6-valved at the top. Seeds numerous, rough on the surface; embryo curved. Nearly all the species are from the northern hemisphere, and especially abundant in the Mediterranean region. So named from the Greek σίαλον, saliva, many species being covered with a viscid excretion, which is sufficiently adhesive in some to hold small insects; hence the English name Catchfly.

1. *S. Armèria.*—An erect annual with unbranched viscid stems about 18 inches high, and glaucous smooth leaves. Flowers small, in dense terminal cymes, bright rosy carmine. A very pretty plant when grown in tufts. There are dull-coloured varieties and one quite white. This is occasionally met with in this country on old walls, &c.

2. *S. compácta* (fig. 47).—A similar but much prettier



Fig. 47. Silene compacta. (½ nat. size.)



Fig. 48. Silene pendula. (½ nat. size.)

species from Southern Russia and the Caucasus. The flowers are of the same colour as in the preceding, but larger. It is, however, a tender and delicate plant requiring a dry sheltered position.

3. *S. ornàta.*—A strong-growing annual species about 2 feet high, with large purple flowers. A native of the South of Africa.

4. *S. péndula* (fig. 48).—This is one of the commonest and prettiest of the tribe, either for edging or growing in masses. It is about a foot high, with rosy purple or white flowers, appearing in May and June. A native of Sicily.

5. *S. marítima.*—A perennial native species with large white flowers, about 8 lines in diameter. Stems spreading. This is very near the common *S. inflàta*, but differs in its diffuse habit, fewer flowers, and shortly cleft petals with broad lobes having two scales at the base.

6. *S. Schàfta.*—This is one of the best of the perennial species, distinguished by its dwarf habit, about 6 inches high, lanceolate acute leaves, and large purple flowers, solitary or two together. The calyx is very slightly inflated. It continues in bloom all the Summer. Siberia.

7. *S. acaùlis.*—A very dwarf plant growing in dense tufts, with small linear crowded leaves, and solitary pink or white flowers on short peduncles. Petals shortly cleft, with a notched scale at the base of the blade. This is found on the summits of the higher mountains of Britain, and has a very wide distribution in the temperate and Arctic regions of the northern hemisphere.

8. *S. fimbriàta.*—This grows about 2 feet high, with ovate-lanceolate leaves and large panicles of white flowers, remarkable for their fringed petals and widely-inflated calyx. A native of the Caucasus.

6. LŸCHNIS.

A genus closely allied to the last, differing chiefly in having more than three styles, usually five, more rarely four, and larger flowers. About thirty species, all natives of the northern temperate zone. From λύχνος, a lamp or light, in allusion to the bright-coloured flowers of some species.

§ 1. Agrostémma. *Petals without scales at the base of the blade.*

1. *L. coronària* (fig. 49).—A tall biennial or perennial with thick woolly leaves and large flowers on long peduncles. The flowers are rose or purplish crimson, more rarely white; but the double purple is the handsomest variety. A native of the South of Europe, flowering in Autumn.

2. *L. cœli-rosea.*—An annual species about a foot high, not tomentose, growing in tufts, with solitary terminal delicate rose, white or bright purple flowers. From the Levant.

3. *L. Githago.* Corn Cockle.—Distinguished from the other species of this section by the calyx-lobes being much longer than the petals. This is a frequent plant in corn-fields, especially where foreign seed has been sown. We merely mention it here on account of its being one of our showiest wild flowers.

§ 2. Eulychnis. *Petals with an appendage at the base of the blade.*

4. *L. Chalcedonica* (fig. 50).—This is the most familiar of the tribe, and a common occupant of our gardens, growing



Fig. 49. Lychnis coronaria. (¼ nat size.)



Fig. 50. Lychnis Chalcedonica. (¼ nat. size.)

3 feet or more high, and bearing dense clusters of brilliant scarlet flowers. There are rose and white and double varieties. A native of Russia; of perennial duration.

5. *L. fúlgens.*—A Siberian species from 1 to 2 feet high, with hairy stems and foliage, and relatively large bright scarlet flowers. This is a superb plant, and the varieties known under the name of *L. Haageàna* are supposed to have sprung from a cross between this and the next. There are salmon, orange, red, scarlet, and white varieties.

6. *L. Siebóldi.*—A Japanese species with immense creamy-white flowers.

7. *L. grandiflòra.*—A large red-flowered species. A native of China. A handsome plant, rarely seen in gardens now.

8. *L. Flos-cùculi.* Ragged Robin.—This common wild flower, with deeply 4-lobed deep rose-coloured petals, has produced a double variety which makes a handsome border plant. The flowers are occasionally seen white.

9. *L. Viscària.*—A dwarf species, and one of the older inhabitants of gardens. Stems clammy at the nodes, generally less than a foot high. Leaves narrow, lanceolate, on short petioles. Cymes few-flowered; flowers purple or red, nearly sessile. There is a handsome double variety. A native of Europe, including North Britain, and Siberia.

10. *L. alpìna.*—Another indigenous species. It is a mountain plant, growing in tufts about 6 inches high, and quite glabrous. Leaves crowded, linear-lanceolate. Flowers in dense heads, rose-coloured, six lines in diameter, on short peduncles with reddish bracts.

L. diùrna, Red Campion, and *L. vespertìna*, White Campion, are showy hedgerow plants.

Tribe II.—*ALSÌNEÆ.*

Sepals free to the base.

7. CERÁSTIUM.

Decumbent densely hairy annual or perennial herbs with small white flowers and bifid petals. Forty species, natives of the temperate and cold parts of the whole world. Name from *κέρας*, a horn, from the horn-like capsule.

1. *C. tomentòsum.*—This is the species in general use for edging. Its small leaves are densely clothed with a greyish or nearly white tomentum. South of Europe.

2. *C. Bieberstéini.*—A similar but larger plant with less silvery leaves. A native of the Crimea.

C. triviàle, *C. glomeràtum*, and *Stellària mèdia*, Chickweed, a closely allied plant, are exceedingly common garden and cornfield weeds. *Stellària Holóstea* is a common hedgerow perennial of weak straggling habit, with large pure white flowers having deeply lobed petals.

Order XVIII.—PORTULÀCEÆ.

A small order of dwarf often trailing and succulent herbs, rarely shrubs, with brightly coloured flowers. They are distinguished from the neighbouring orders by having fewer sepals (usually only 2) than petals, and usually numerous stamens. *Móntia fontàna*, an inconspicuous weed, is the only indigenous representative.

1. PORTULÁCA.

Herbs with fleshy stems and leaves and scarious stipules. Leaves entire, flat or terete, the upper ones sometimes forming an involucre beneath the flowers. Sepals 2, cohering at the base in a tube adnate to the ovary. Petals 5. Stamens numerous, perigynous with the petals. Capsule membranaceous, half-inferior, the free part dehiscing transversely. Seeds numerous. There are sixteen species, all intertropical, and chiefly American. From *porto*, to bear, and *lac*, milk, referring to the milky juice.

1. *P. grandiflòra* (fig. 51).—A very handsome annual when grown in light soil in a sunny situation. It has given birth to



Fig. 51. Portulaca grandiflora. (¼ nat. size.)

numerous varieties, some of which have been separated as distinct species. They are of the most brilliant shades of orange yellow, crimson, rose, or variegated and striped or spotted with two or more colours or shades, including white. There are

double and single varieties. It includes *Thellussòni*, with scarlet flowers having a white centre; and *splèndens*, with crimson or purple flowers. A native of South America, and rather tender.

2. CALANDRÍNIA.

Glabrous annual or perennial herbs, shrubby at the base. Leaves alternate or fasciculate, fleshy. Flowers in racemes or umbels, rarely solitary. Sepals 2, free. Petals 5, rarely fewer or many, hypogynous as are the numerous stamens. Capsule 3-valved. About sixty species are reported, natives of America and Australia. Named in honour of a German botanist. The three species noticed here are all from Chili, and perennial, though usually treated as tender annuals. They are very showy little plants, but open their flowers only when the sun shines upon them.

1. *C. díscolor.*—About a foot high with large flowers in racemes. The petals are broad, rosy purple, contrasting well with the numerous orange-coloured stamens.

2. *C. grandiflòra.*—Similar to the last, but, contrary to the signification of the name, with smaller flowers of a darker purple.

3. *C. umbellàta.*—A dwarfer species, smaller in all its parts, with the crimson or purple flowers collected in the form of an umbel.

Order XIX.—TAMARISCÌNEÆ.

Shrubs or small trees with very minute often scale-like imbricate leaves, and small flowers in dense spikes. Sepals 5, rarely 4, imbricate in bud. Petals of the same number or more, free or slightly connate at the base, imbricate in bud. Stamens 4 to 10, free or connate below, inserted in the disk; anthers versatile. Disk hypogynous or slightly perigynous, furnished with 10 glands. Capsule 3–5-valved. Seeds erect, plumose or winged; albumen none. *Támarix* yields manna and galls. A small order; from the temperate and warm regions.

1. TÁMARIX.

The characters as above. About twenty species are known. The name is from *Tamaris*, a river in Spain, where this genus abounds. These shrubs are invaluable for planting by the sea-side, where scarcely anything else will grow.

1. *T. Gállica.*—This is the common species, growing from 5 to 10 feet, with long and slender branches, and almost feathery ultimate branchlets. Leaves very minute and triangular, larger on the older branches and subulate. Flower-spikes lateral; flowers pentamerous, rose, pink or white; bracts acuminate-cuspidate. This is naturalised in some parts of Britain. It includes *T. Ànglica*, *T. pentándra*, etc.

2. *T. tetrándra*, syn. *Africàna*, *parviflòra*, etc., of gardens. —The flowers in this species are usually tetramerous, and produced from the old wood. They are white, tinged with red. The varieties referred here are not so hardy as the foregoing. The true plant is from south-eastern Europe, but the species are very difficult of determination, and possibly this may be incorrectly named.

3. *T. Germánica*, syn. *Myricària.*—Distinguished from the true Tamarisks by 5 sepals, 8 petals, and 10 stamens combined at the base. A shrubby plant 4 to 8 feet high, with very small leaves and red flowers in terminate bracteolate spikes from 2 to 3 inches long. A native of Central and Southern Europe, blooming all the Summer.

Order XX.—HYPERICÌNEÆ.

Herbs or shrubs with opposite simple exstipulate entire or glandular-toothed leaves, often having transparent glands, and yellow (rarely white) flowers. Sepals 5 or 4, imbricate. Petals of the same number, contorted in the bud. Stamens usually numerous, and united in three or more bundles, rarely few with free filaments. Fruit capsular, composed of 3 to 5 united carpels dehiscing septicidally, or baccate. Seeds few or many, exalbuminous. A small order; as characterised above, it does not include all the exotic genera.

1. HYPÉRICUM.

Characters as above. About 160 species, found in all temperate regions, and at great elevations within the tropics. The name is of Greek origin, supposed to have been applied to a species of this genus. Popularly known as St. John's Wort. There are 9 or 10 British species.

1. *H. calycìnum.* Rose of Sharon, Aaron's Beard.—This species has larger flowers than any other, and is the one most

commonly seen in gardens. It is a prostrate creeping shrubby plant with oblong obtuse coriaceous glossy leaves with very small pellucid dots, and large terminal bright yellow flowers 3 to 4 inches in diameter. July to September. A native of South-eastern Europe, occasionally met with in this country as a waif or outcast from gardens.

2. *H. hircìnum*.—A much-branched shrub 3 to 4 feet high. Leaves oblong-lanceolate, obtuse, quite entire, about 2 inches long; glands scattered, linear. Flowers yellow, 1½ inch in diameter, borne in small terminal cymes. A pretty shrub, often remaining in bloom till the end of October. Native of the South of Europe. This species emits a peculiar goat-like odour when rubbed.

3. *H. Androsæmum*. Tutsan, Sweet Amber.—A native erect shrubby species about 2 feet high, with ovate subcordate leaves having numerous very minute glandular dots. Flowers yellow, 6 to 8 lines in diameter, in terminal clustered cymes.

4. *H. elàtum*.—Very near the last, but in this the flowers are rather larger, and the styles longer than the stamens. An introduced species, occasionally found in a semi-wild state.

5. *H. elòdes*.—A very distinct native species, found in wet boggy places. It is a creeping herbaceous plant with orbicular or oblong amplexicaul villous leaves about 6 lines long, and small pale yellow flowers whose sepals are margined with reddish glands.

H. prolìficum and *H. Kalmiànum* are North American shrubby species, remarkable in having very numerous stamens only slightly united at the base into five bundles. These two species are very near in character, the leaves of the former being larger, and the flowers smaller, with more than three carpels.

Order XXI.—TERNSTRŒMIÀCEÆ.

A small order of trees and shrubs with alternate simple exstipulate leaves and white, pink, or red flowers. Peduncles 1-flowered, axillary or terminal. Sepals 5 or 7, imbricated, coriaceous and deciduous. Petals 5 to 9, often cohering at the base. Stamens numerous, hypogynous; sometimes monadelphous. Stigmas on a long style. Capsule 2- to 7-celled, few-seeded. Seeds large, albumen none or thin. Chiefly from the tropics; a few in China and Japan and North America.

1. EÙRYA.

Flowers dicœcious. Sepals 5. Petals 5, cohering at the base. Stamens from 5 to 15. Fruit a berry. Evergreen shrubs with glabrous often crenate leaves and small white flowers on axillary fascicled peduncles. About ten species, all Asiatic. The name is said to be derived from *εὐρύς*, broad, ample, in allusion to the flowers; but it is hardly applicable, the flowers being rather small for the family.

1. *E. latifòlia variegàta.*—Under this name we have a pretty shrub in our gardens. Leaves quite glabrous, entire, oblong-lanceolate, obtusely acuminate, variegated chiefly on the margin with pale yellow. A native of Japan, and probably requiring protection in severe weather. This is perhaps one of the many forms of *E. Japónica*, a very variable species.

2. CAMÉLLIA (including *Thèa*).

Sepals 5 or 6, passing gradually from bracteoles into petals, the latter slightly cohering at the base. Stamens many. Capsule woody, 3- to 5-celled; cells usually 1-seeded; seeds exalbuminous. The Camellias are usually treated as greenhouse plants, but as the common single one succeeds very well in the south-western counties with slight protection, it is included here.

1. *C. Japónica.*—It is unnecessary to particularise varieties here or introduce a detailed description. As an out-door shrub some of the original varieties grow well in sheltered situations and produce their flowers very freely after a mild winter.

The Tea-tree (*Thèa Chinénsis*), referred to this genus, is grown by some amateurs more on account of the interest attached to it than for ornament.

Stachyùrus prǽcox and *Actinídia polýgama*, syn. *Trochostígma*, are members of this family, the former from Japan and the latter from Eastern Siberia. Neither of them is at all common in gardens. The latter is of climbing habit, bearing cordate serrate petiolate leaves and white fragrant flowers appearing in Summer, and followed by edible berries. The former has small greenish-yellow pendent racemose flowers, in Spring preceding the leaves.

Order XXII.—MALVÀCEÆ.

An extensive and very distinct order of herbs, shrubs, or rarely trees, with stellate hairs, alternate stipulate leaves, and usually showy flowers. Flowers regular, usually furnished with a bracteate involucel. Sepals 5, more or less united at the base, valvate in bud. Petals 5, often oblique, twisted in bud. Stamens many; filaments combined into a tube; anthers 1-celled. Disk small, sometimes growing up between the carpels. Carpels numerous, usually whorled, free or combined, 1-or more seeded. Seeds reniform, obovoid or sub-globose, often hairy, with little or no albumen. All the species are harmless, and many mucilaginous. Cotton is the produce of a member of this family. The species occur in all parts of the world except the very coldest.

1. MÁLOPE.

Hairy or glabrous annuals or biennials. Leaves entire or trifid. Involucel of 3 large distinct cordate bracts. Calyx 5-lobed, persistent. Carpels 1-seeded, irregularly clustered. Three species, natives of the Mediterranean region. The name is said to be derived from μαλός, woolly.

1. *M. trífida.*—A showy plant, about 3 feet high, with rather small somewhat trilobed dentate leaves and rosy purple or white flowers. *M. grandiflòra* of gardens is a variety of this plant, or rather perhaps the selfsame thing.

2. *M. malacoìdes.*—A prostrate branching hairy biennial. Leaves petiolate, oblong-ovate, crenate or pinnatifid, cuneate or cordate at the base. Flowers axillary, large, rosy pink tinged with purple; peduncles 1-flowered. A very handsome plant.

2. KITAIBÈLIA.

Differing from the last genus in having an involucel of 6 to 9 connate bracts. Only one species is known, a native of Hungary. A commemorative name.

1. *K. vitifólia.*—A tall plant with angular 5-lobed leaves. Involucel exceeding the calyx. Flowers pedunculate in the axils of the upper leaves, large, showy, white or rose, produced all the Summer.

3. PALÀVA.

This genus has the carpels irregularly disposed in a head like the two preceding genera, but it is readily distinguished from them by the absence of involucral bracts. Three species are described, from Peru and Chili.



Fig. 52. Althæa rosea. (⅛ nat. size.)

1. *P. flexuòsa.* — An elegant annual with slender stems about 1 foot high, bipinnatifid pilose petiolate leaves, and showy lilac-purple flowers on long slender peduncles.

4. ALTHÆA.

Tall or dwarf hairy herbs with lobed leaves and axillary solitary or racemose flowers. Involucel 6- to 9-lobed. Staminal column long, filaments free at the top. Carpels arranged in a regular whorl, 1-seeded, indehiscent. About twelve species, from temperate and warm countries. *A. officinàlis* is the Marsh Mallow. From *ἄλθω*, to heal or cure.

1. *A. ròsea* (fig. 52). Hollyhock. — This noble plant is the principal ornamental species in this family. It came originally from the Levant, and has been in cultivation about three centuries. It is often treated as a biennial, but it is really perennial. The ordinary single-flowered form, although very

beautiful, has been quite superseded in gardens by the many splendid double-flowered varieties, ranging in colour from white, yellow, rose, and purple to violet and almost black, with every intermediate shade and tint of these colours.

There are many other species of inferior merit, but they are seldom seen in cultivation, except in botanical collections.

5. LAVATÈRA.

Shrubs, occasionally arborescent, or herbs, with angled or lobed leaves and axillary and solitary or clustered or terminal and racemose flowers. Very near *Málva*, but differing in having the three to six lobes of the involucel coherent about half-way up. Carpels in a flattened whorl, indehiscent. About eighteen species, whereof one is Australian, two are from the Canaries, and the others from the Mediterranean countries. Named in honour of the brothers Lavater, Swiss physicians.

1. *L. arbòrea.* Tree Mallow.—A tall biennial species, softly pubescent all over. Leaves large, on long petioles, 5- to 9-lobed, crenate. Flowers purple, on short crowded axillary peduncles, about 2 inches across. This has a stout stem throwing off numerous lateral branches, and forms a very handsome small tree. In rich soil in the South of England it often attains a height of 12 or 15 feet. It is occasionally met with on our coasts, but is generally considered to be an introduced plant.

2. *L. trimèstris* (fig. 53).—A common annual species, about 3 feet high, with rosy pink or white solitary axillary flowers with a dark centre. A pretty plant where it has plenty of space, flowering freely for a longer period than many annuals. Spain.



Fig. 53. Lavatera trimestris. (⅓ nat. size.)

6. MÁLVA.

Hairy or glabrous herbs with angular or lobed leaves and axillary flowers. Involucel of 3 distinct free bracts. Carpels

not beaked, whorled, separating from a short conical axis, indehiscent. There are about sixteen species, from Europe, temperate Asia, and northern Africa, some of them widely-spread weeds of cultivation. Named from μαλάχη, to soften, referring to the emollient nature of its species. *M. sylvéstris* is a common native erect species with numerous axillary lilac-purple flowers; and *M. rotúndifolia* is of decumbent habit.

1. *M. moschàta.*—A pretty indigenous perennial species with erect hairy stems 2 to 3 feet high, and deeply divided leaves with pinnatifid lobes. Flowers about 2 inches in diameter, rosy pink, rarely white, borne in clusters at the tops of the stems.

2. *M. Mauritiàna.*—An erect annual with palmately lobed leaves and large white flowers striped with rose or violet. A native of North Africa.

3. *M. laterítia*, syn. *Malvástrum.*—A prostrate hirsute perennial with 3- to 5-lobed leaves and handsome brick-red flowers on long peduncles. A native of South America, blooming in Autumn.

4. *M. crispa.*—An annual plant with white flowers, more remarkable for its large rounded curled leaves than for its blossom. Native of Syria.

7. CALLÍRHOË.

Summer-flowering perennial herbs with the habit of *Málva*, differing from that genus in the structure of the carpels, which are provided with a short beak. Involucel of 1 to 3 free bracts, or wanting. These very handsome plants, about seven in number, are from North America. They are sometimes referred to *Málva*, and formerly they bore the name *Nuttállia*. The name is of classical origin.

1. *C. involucràta.*—This is one of the species with an involucel. It is of straggling habit, with cordate deeply-lobed leaves, lobes again divided into narrow acute segments. Flowers solitary, on long peduncles, purple with a light centre.

2. *C. pedàta.*—An erect branching species, about a yard high, with pedate leaves. Flowers about 3 inches in diameter, purple, with a white spot at the base of each petal.

Other species are: *C. cordifòlia*, with pink flowers; *C. digitàta*, syn. *Nuttállia grandiflòra*, destitute of involucel and having fringed petals of a bright crimson purple; and *C. Papàver*, similar to the last, with a 3-leaved involucel, and rich claret-purple flowers on long peduncles.

8. HIBÍSCUS.

Herbs, shrubs, or trees. Leaves often lobed. Flowers very large and showy, variously coloured, usually with a dark-coloured spot at the base of each petal. Involucel of many (rarely 4 or 5) more or less united bracts. This differs from all the preceding genera in the staminal column not being antheriferous to the top, and in the 5-celled fruit having more than one seed in each cell, and other particulars. Species very numerous, chiefly from the tropics. The Latin name for a plant of this order.

1. *H. Triònum*, syn. *H. Africànus*.—A hispid branched annual, woody at the base. Leaves cordate, palmately lobed, lobes linear. Involucel bracts many, bristly. Flowers yellow with a purple centre. A very widely distributed plant, occurring in Asia, Australia, North and South Africa, and South of Europe.



Fig. 54. Hibiscus roseus. (¼ nat. size.)



Fig. 55. Hibiscus Syriacus. (¼ nat. size.)

2. *H. ròseus* (fig. 54).—This, with its varieties *militàris* and *palústris*, is a native of North America; but in consequence of its having become naturalised in the neighbourhood of

Bordeaux it is quoted as a native of France in many English books. It is a tall herbaceous perennial with enormous blossoms either purple or pink with a darker centre, appearing in August.

3. *H. Syrìacus* (fig. 55), syn. *Althæa frùtex.*—A deciduous shrub, 6 to 8 feet high, with alternate 3-lobed toothed leaves and axillary flowers. There are many varieties, both single- and double-flowered, white, yellow, rose, purple, violet, and striped, with a darker coloured spot at the base of each petal. A desirable shrub, on account of its showy flowers being produced towards the end of Summer or beginning of Autumn.

Order XXIII.—STERCULIÀCEÆ.

This is a large order of trees and shrubs, differing from the preceding order principally in having 2-celled anthers. We introduce it here for the sake of including the following hardy ornamental shrub.

1. FREMÓNTIA.

This genus is distinguished by its coloured calyx and absence of petals, and staminal column divided into 5 branches. Capsule 4- or 5-celled, splitting through the cells. Seeds numerous. Named after Colonel Fremont, who first detected it in California.

1. *F. Califórnica.*—A deciduous shrub from 6 to 10 feet high. Leaves large, cordate, 5- to 7-lobed, clothed with rusty hairs beneath. Flowers rather large, bright yellow, solitary on short peduncles opposite the leaves. This beautiful shrub is still very rare in gardens.

Order XXIV.—TILIÀCEÆ.

A considerable order of plants, differing from its allies in having many nearly free stamens with 2-celled anthers. With the exception of the typical genus the members of this order are natives of the warmer and tropical regions of both hemispheres.

1. TÍLIA.

Trees with simple or stellate hairs. Leaves alternate, stipulate, obliquely cordate, serrate or lobed, on long petioles. Flowers fragrant, white or yellowish, in axillary or terminal cymes, with a leafy bract adnate to the peduncle. Sepals 5,

valvate. Petals 5, often with a scale at the base. Stamens numerous. Ovary 5-celled. Fruit globose, nut-like, indehiscent; 1- or 2-seeded; seeds albuminous. About eight species, from the temperate region of the northern hemisphere. The Latin name of this genus. The Lime-tree, or Linden, in its numerous variations forms one of our handsomest ornamental trees. The Russian *bast* is from the bark of the Lime-tree.

1. *T. Europæa.* Lime-tree.—This, in its ordinary form, is a stately tree 60 to 100 feet high; but the varieties of it differ greatly in stature and size and form of leaf, and presence or absence of pubescence on the leaves and fruits. Many of these forms have been described as species, though they are now usually ranged under this name. The common native variety is *parvifòlia*—a small tree with small glabrous leaves and hairy fruits. The one commonly planted is called *grandifòlia*, and has large leaves which are downy beneath and ribbed fruits; and there is a handsome weeping variety of this. The variety *laciniàta* has lobed leaves, and *corallìna* (or *rùbra*) bright red twigs—this is a very handsome variety; *aùrea* has golden-yellow twigs, and there are several other varieties of more or less merit.

2. *T. argéntea*, syn. *T. tomentòsa* and *T. álba* (not of Michaux).—The bark of this species is greyish white, and the leaves are clothed with a silvery pubescence beneath. It blooms later than the common one, and retains its leaves later in Autumn. This is a native of South-eastern Europe and Asia Minor, now tolerably abundant in this country, and one of the handsomest in cultivation.

3. *T. Americàna*, syn. *T. Canadénsis*, *T. nìgra*, and *T. glàbra.*—This is the commonest of the American species in cultivation, being represented by several varieties. They may be distinguished by their obliquely broadly cordate or truncate deeply mucronately toothed glabrous leaves. There are several names besides those above enumerated given to slight and often inconstant varieties. One form has leaves a foot or more long and proportionately broad.

T. álba, *T. heterophýlla*, and *T. pubéscens* are the names of other North American species, but the same names are employed for some varieties of the European species.

The *T. dasystỳla* of Loudon, or *euchlòra* of Koch, if indeed both authors had the same thing in view, is a handsome form with dark green glabrous leaves except on the under side in the angles of the principal nerves.

Besides the foregoing there is a set of fine large-leaved varieties or forms in cultivation, including *T. Mandshùrica* from Eastern Asia, probably a distinct species, with coarsely toothed deeply cordate leaves clothed with a grey pubescence beneath. *T. hỳbrida supérba* referred to the North American *T. pubéscens*, and *T. vitifòlia* to *T. Europæa*.

Order XXV.—LÌNEÆ.

This order taken in its widest sense includes a great many trees and shrubs, but the following characters apply to the typical genus, which alone concerns us.

1. LÌNUM.

Herbs, sometimes shrubby, glabrous, more rarely hirsute. Leaves alternate, rarely opposite, narrow, entire; stipules



Fig. 56. Linum grandiflorum. (½ nat. size.)

absent or glandular. Flowers in terminal or lateral racemose panicles or fascicled cymes, blue, white, yellow, or crimson. Sepals 5, entire. Petals 5, contorted, fugacious. Stamens 5, united at the base, alternating with 5 staminodes. Disk of 5

glands opposite the petals. Capsule 5-celled, dehiscing septicidally, cells 2-seeded, or sometimes 10-celled with the cells 1-seeded. Albumen thin. About eighty species are distributed over the temperate and warm regions of the globe. The Flax from which linen is manufactured is the fibre from the stems of *L. usitatíssimum.*

1. *L. grandiflòrum* (fig. 56). — This is one of the handsomest annual species, having beautiful crimson flowers. It grows about 18 inches high, with slender erect stems. A native of North Africa.

2. *L. alpìnum.*—A pretty dwarf perennial species about 6 inches high with dark blue flowers. Stems decumbent. Leaves short, linear-acute. A European species, flowering in Summer.

3. *L. campanulàtum.*—Perennial, growing about 18 inches high. Leaves broadly lanceolate, glaucous. Flowers large, bright yellow. South of Europe.

4. *L. perénne.*—A native species. Stems erect, 1 to 2 feet high, very slender. Leaves 6 to 8 lines long, narrow, linear-lanceolate, acute. Flowers normally blue; but there are several varieties, including a pink and a white. One of the best, as it is quite hardy.

L. arbòreum and *L. flàvum* are handsome yellow-flowering species. The former is a shrubby evergreen, and rather tender. The common Flax is also a very pretty plant.

Order XXVI.—GERANIÀCEÆ.

(Including *Oxálideæ*, *Balsamìneæ*, *Tropæòleæ*, and *Limnánthex.*)

Herbs, occasionally climbing, undershrubs, shrubs, or rarely trees. Leaves opposite or alternate, often bistipulate, rarely entire. Flowers often showy, regular or irregular, hermaphrodite, usually sub-umbellate, or solitary and axillary, rarely cymose or racemose. Sepals 5, seldom fewer, free, or sometimes united to the middle, imbricate or valvate, the upper one spurred in some genera. Petals 5, or by abortion fewer or quite absent, imbricated or contorted. Disk of 5 glands, opposite the sepals, or eglandular. Stamens usually 10, rarely more or fewer. Fruit either capsular, of 3 to 5 1-seeded carpels terminating in long slender awns and separating from the placentiferous axis with elasticity, or 2- to many-seeded with a dorsal loculicidal dehiscence, or consisting of 3 to 5 indehiscent indurated cocci separating from the axis, rarely baccate. Seeds

variable, with or without albumen. There are 16 genera and about 750 species, found in nearly all parts of the world, but especially numerous in South Africa.

1. GERÀNIUM.

Herbs, rarely shrubby, stems often tumid at the joints. Leaves opposite or alternate, bistipulate, dentate, palmately or rarely pinnately lobed or dissected. Peduncles axillary, 1- or 2-flowered. Flowers regular. Sepals and petals imbricate in bud. Stamens usually 10, of which 5 are sometimes imperfect. Carpels 5, separating from the axis below and curled upwards; seeds 1 in each carpel. There are about 100 species, very widely distributed. About twelve are natives of Britain. *G. Robertiànum* is perhaps the commonest. It is an erect fœtid plant with reddish stems, much divided leaves, and small striped red flowers. The name is derived from *γέρανος*, a crane, from the beak-like termination of the fruit—hence the English name, Cranesbill.

1. *G. sanguíneum.*—An indigenous perennial species from 1 to 2 feet high. Stems geniculate. Leaves pilose, orbicular, 5- to 7-partite, lobes again divided into 3 or 5 narrow segments. Sepals awned. Peduncles usually 1-flowered. Flowers about $1\frac{1}{2}$ inch in diameter, reddish purple. A very handsome species. There is also a distinct variety of more prostrate habit with pinkish flowers; it is the *G. Lancastriénse* of gardens.



Fig. 57. Geranium platypetalum. ($\frac{1}{4}$ nat. size.)

2. *G. platypétalum* (fig. 57).—A Caucasian species. This is allied to *sylváticum*, a handsome native species having clusters of purplish flowers. It is a very hairy plant, bearing a profusion of violet-blue flowers. This is sometimes grown under the name *Ibèricum*, which is a very similar plant, and of which it may be a simple variety.

3. *G. striàtum.*—A very common species in cultivation. It usually grows about a foot

high in compact tufts. Leaves 3- to 5-lobed; lobes toothed. Peduncles 2- or 3-flowered. Flowers white, striped with rose. A free-blooming species throughout the Summer. South of Europe.

4. *G. phæum.*—About 18 inches high and similar to *G. praténse*, with fewer smaller dusky dark purple flowers. Leaves on long petioles, orbicular or reniform, 5- to 7-lobed, lobes cut and serrate. Peduncles deflexed, 2-flowered. Central Europe; naturalised in some parts of England.

There are several other species in cultivation, including *G. Endréssii*, with large rose-coloured flowers; *G. praténse*, a tall native species with deep blue flowers; and *G. tuberòsum*, rose-coloured flowers.

2. PELARGÒNIUM.

Herbs, often shrubby. This genus is distinguished from the preceding by its usually umbellate irregular flowers, in which the petals are dissimilar, and in the upper sepal being furnished with a spur, which is adnate to the pedicel. There are about 170 species of this genus; with the exception of 3 North African and Oriental species, 2 or 3 Australasian species, and 1 or 2 from St. Helena, all are natives of South Africa. Name from πελαργός, a stork, in reference to the beaked carpels. Although none of the members of this genus are hardy in England, we introduce it here because so many are grown for the Summer embellishment of gardens. These are popularly termed Geraniums. We must limit ourselves to a short notice of the principal species, which have given birth to the numerous beautiful varieties now in cultivation. The species have been so variously intercrossed and recrossed that it is impossible to refer some of the varieties with any degree of certainty to this or that species; but there are several tolerably well-defined races or classes of varieties. Pelargoniums have been cultivated now upwards of 150 years, and English gardeners may claim the credit of having contributed more towards their improvement than the gardeners of all other nations collectively. It does not come within our province to enumerate varieties or even to discriminate all the classes founded by horticulturists. Information of this description is better drawn from the annual catalogues of the principal florists. The 'Show' and 'Fancy' Pelargoniums are the descendants of *P. grandiflòrum*, and some other species; but as they are not usually employed out of doors we must dismiss them without further comment.

1. *P. inquinans* (fig. 58). Scarlet Pelargonium.—This is the most important species, and the basis of nearly all the best



Fig. 58. Pelargonium inquinans. (¼ nat. size.)

varieties in cultivation. The habit of the plant as well as the form of the petals of this is superior to that of the following. Naturally it is an undershrub with large reniform green indistinctly zoned leaves, rather soft to the touch, and exhaling when rubbed an aromatic odour which is unpleasant to some persons. The petals are broad, bright scarlet, and the flowers produced in large umbels 15 to 30 together. The varieties include every tint of scarlet, pink, rose, salmon, and cream, to pure white, with many magnificent double ones.

2. *P. zonàle* (fig. 59). Zonal Pelargonium.—A smaller species than the preceding, having the leaves strongly zoned, and the petals much narrower, of a deep carmine. Most of the better varieties, showing the characteristics of this species,

are of quite recent origin. The 'Tricolors,' such as *Mrs. Pollock* and *Sunset*, etc., appear to be intermediate between this and the foregoing species.



Fig. 59. Pelargonium zonale. (½ nat. size.)

3. *P. peltàtum.* Ivy-leaved Pelargonium. — A prostrate trailing shrubby species with slender branches. Leaves 5-lobed, glabrous, shining, fleshy, with a narrow zone in the centre. Flowers comparatively large, white or rose veined with purple. A beautiful species for bordering, and especially for vases and baskets. Within the last two or three years several very elegant and beautiful new varieties of this species have been raised, some with variegated leaves, and others developing a greater choice of colour in the flowers.

We can scarcely leave this genus without an allusion to those species with sweet-scented foliage, *P. capitàtum*, *P. gravèolens*, and *P. quercifòlium.*

3. TROPÆOLUM.

Climbing, trailing, or diffuse annual or perennial herbs, often tuberous-rooted. Leaves alternate, peltate, or palmately-lobed or dissected; stipules none, or minute. Flowers pedunculate, solitary, axillary, irregular, orange-yellow, purple, or

blue. Sepals 5, the upper one produced downwards into a free spur. Petals unequal, 5, or by abortion fewer, often fringed or bearded at the base. Stamens 8, free, all antheriferous. Fruit of usually three fleshy indehiscent 1-seeded carpels; seeds exalbuminous. About thirty-five species are known, all inhabiting South America. The name is said to be derived from τρόπαιον, a trophy. The tubers of some species are used as an article of diet in Peru.

Annual Species.

1. *T. adúncum*, syn. *T. peregrìnum.*—This is commonly known as the Canary Creeper, and sometimes named *T. Canariénse;* but it is a native of America only. It is very distinct, and readily distinguished by its slender stems, 3- to 5-lobed leaves, and bright canary-yellow flowers with narrow petals.

2. *T. màjus* (fig. 60). Taller Nasturtium or Indian Cress.—This is the common tall-growing kind, the carpels of which are



Fig. 60. Tropæolum majus. (¼ nat. size.)

used as a substitute for capers. In the typical plant the flowers are yellow, but there are crimson, scarlet, orange, and striped single varieties, and also double-flowered forms, in cultivation.

3. *T. mìnus.* Smaller Nasturtium.—Similar to the last, of dwarfer growth, with smaller flowers of a more reddish-orange colour. The varieties of this are very numerous and beautiful. The carpels of this are said to be superior for pickling to those of the preceding species.

4. *T. Lobbiànum.*—A strong growing species, more like No. 2 in habit, but the leaves are slightly villous, and the orange and scarlet petals are fringed. Many of the beautiful bedding varieties belong to this species, though it is probable that some of them are of hybrid origin between this and the foregoing.

Perennial tuberous-rooted Species.

5. *T. édule.*—A climbing species with slender tortuous stems and leaves of 5 to 7 narrow lanceolate glaucous divergent lobes. Flowers orange or yellow. This and all of the perennial species are rather tender, and comparatively rare in gardens on account of the difficulty experienced in growing them.

6. *T. tuberòsum.*—A smaller plant than the last. Leaves smooth, obtusely 5-lobed; lobes rounded. Petals yellow within, spur reddish-orange.

7. *T. pentaphýllum*, syn. *Chymocárpus pentaphýllus.*—A very distinct species with slender tortuous stems. Leaves composed of five distinct oblong-lanceolate leaflets. In this species the calyx, especially the bright red spur, forms the most conspicuous part of the flowers, the petals being small, greenish in colour, and only two in number. The fruit of this, too, is more decidedly fleshy and juicy.

4. LIMNÁNTHES.

Diffuse glabrous annuals with alternate dissected exstipulate leaves. Flowers regular, pedunculate, solitary, axillary, white, yellow, or rose. Sepals 5, valvate. Petals 5, sub-perigynous, contorted. Stamens 10, free, inserted with the petals. Fruit of about 5 indehiscent indurated 1-seeded carpels. There are three Californian species, only one of which is in general cultivation. From λίμνη, a marsh, and ἄνθος.

1. *L. Douglásii.*—A prostrate pinnate-leaved annual with yellow or white rather large sweet-scented flowers.

5. OXÀLIS.

Herbs, or rarely dwarf shrubs. Leaves usually 3-foliolate, sometimes plurifoliate or pinnate, stipulate or exstipulate, alternate. Flowers regular, on axillary or radical 1- or more flowered peduncles. Sepals 5, imbricate. Petals 5, contorted. Stamens 10, free or connate at the base. Disk none. Capsule 5-celled, dehiscing loculicidally, valves adhering to the axis; seeds one or more in each cell, albuminous. About 220 species

are known, of which three or four are widely distributed, and the rest from South Africa and South America. The name is from ὀξύς, sharp, acid, in reference to the quality of many species. Dimorphic and trimorphic flowers are frequent in this genus, the apetalous ones being very fertile. The pretty Wood Sorrel, *O. Acetosélla*, belongs to this genus, and many of the exotic species are strikingly beautiful.

1. *O. corniculàta.*—This is one of the most widely dispersed plants, occurring in all save very cold countries. A small branching pubescent annual or biennial plant. Leaves all cauline, stipulate, 3-foliolate. Flowers small, yellow, two or three together. There is a handsome variety of this named *rùbra*, with bronzed-purple foliage.

2. *O. Déppei.*—A tuberous-rooted species with quadrifoliolate leaves; leaflets obcordate. Flowers large, lurid red, in umbels, produced all the Summer. Mexico.

3. *O. Valdiviénsis.*—A glabrous annual from 6 to 9 inches high with trifoliolate leaves and rich yellow flowers tinged with red, and borne in long-stalked umbels.

4. *O. ròsea*, syn. *O. floribùnda.* — A Brazilian perennial species with trifoliolate leaves, growing about 6 inches or more high. Leaflets ovate, emarginate. Flowers numerous, umbellate, rose or white.

5. *O. violàcea.*—A hardy North American plant. Leaflets 3, obcordate. Flowers few, umbellate, purplish violet, appearing in May and June.

6. *O. Bówiei.*—This is one of the handsomest of the genus. A perennial about 6 inches high, slightly pubescent, with large trifoliolate leaves and rich purplish red flowers. It is a native of South Africa, and nearly hardy or quite hardy in favourable localities in this country.

6. IMPÀTIENS.

Herbs or undershrubs, usually glabrous. Leaves alternate, opposite or radical, serrate or dentate; petiole often glandular at the base. Peduncles axillary, solitary, or fascicled, one or more flowered. Flowers irregular. Sepals 3, very rarely 5, coloured, imbricated, two lateral flat, two anterior when present small, the posterior or upper produced downwards in a spur. Petals 3, anterior outside, concave, lateral, bifid, formed of two united, the upper lobe exterior. Stamens 5. Capsule 5-celled, many-seeded, the valves opening with elasticity;

seeds exalbuminous. About 140 species are known, chiefly from tropical Asia.

1. *I. Balsamìna* (fig. 61). Common Balsam.—This familiar annual is of Eastern origin. In a wild state it is a very handsome plant with rosy-red flowers; but under cultivation it has given birth to a number of varieties differing to an almost incredible degree from the ordinary type. The flowers are regular and very double in the most esteemed strains; white, cream, yellow, lilac, violet, pink, rose to dark crimson in colour; and there are also striped and spotted varieties. Florists distinguish pyramidal dwarf and camellia-flowered races. This is sometimes employed for bedding or mixed borders in sheltered situations, and is very effective; but to get it in perfection it must be grown in pots.



Fig. 61. Impatiens Balsamina flore pleno. (¼ nat. size.)

There are a few hardy annual species occasionally seen in gardens, but they are hardly worth cultivating, the flowers being small and the habit weedy. *I. Noli-me-tángere*, a tall yellow-flowered species, is the commonest.

Order XXVII.—RUTÀCEÆ.

A considerable order of plants when limited to the *Rùteæ* proper; but the *Aurántieæ* and *Zanthóxyleæ* are now usually associated with them. These plants are remarkable amongst the *Thalamifloreæ* for the glandular cysts abounding in the leaves and flowers, which often contain pungent strongly-scented bitter juices. There are very few hardy members of this family; the majority are found in South Africa and Australia. *Rùta gravèolens*, Common Rue, is a familiar member of this order.

1. DICTÁMNUS.

Calyx 5-partite, deciduous, the lower segments longest. Petals 5, the four upper ones ascending, the lower one distant, turned downwards. Disk annular, fleshy. Stamens 10, free, declinate. Fruit consisting of five confluent rostrate 2- or 3-seeded carpels, dehiscing in two valves. One species, widely dispersed in the north temperate zone in the Old World. This is a very variable plant, and has been divided into several species by some authors. A classical name.

1. *D. álbus* (fig. 62). Fraxinella or Dittany.—An erect suffrutescent herb about 2 feet high. Leaves alternate, unequally pinnate, exhaling a powerful odour when rubbed. This is a handsome plant and a very old inhabitant of cottage gardens. There are rose, bright red and white varieties. Native of Central and Southern Europe, flowering in early Spring.



Fig. 62. Dictamnus albus. (½ nat. size.)

2. PTÈLEA.

Deciduous shrubs or small trees with bitter bark, usually alternate trifoliolate or pinnate leaves with pellucid dots, cymose inconspicuous yellowish green flowers, and orbicular winged fruits. Flowers polygamous. Calyx 4- or 5-partite, lobes imbricate. Petals 4 or 5, much longer than the calyx. Stamens 4 or 5. Ovary 2- or 3-celled, with 2 ovules in each cell. There are six species, from temperate North America. πτελέα is the Greek name of *Úlmus campéstris*, which like this has winged fruits.

1. *P. trifoliàta.* Hop-tree. — A small tree of no special merit, with trifoliolate glabrous yellowish green leaves on long petioles; leaflets ovate, obscurely crenate. The leaves and fruits when bruised emit a powerful odour resembling hops. There is a variegated variety.

Phellodéndron Amurénse is a small hardy tree from North-eastern Asia, with opposite or alternate unequally pinnate eglandular leaves and inconspicuous dicœcious flowers.

3. SKÍMMIA.

Evergreen shrubs with alternate simple petiolate glabrous lanceolate entire leaves with transparent dots and terminal panicles of small white flowers succeeded by scarlet berries. Flowers polygamous, similar in structure to those of *Ptèlea.* Drupe ovoid or spherical, of 2 to 4 1-seeded pyrenes. About four species, from the Himalayas and Japan. The name is from *Skimmi*, the Japanese appellation.

1. *S. Japónica.* The species first introduced. A bush about 4 to 6 feet high, with terminal panicles of whitish flowers succeeded by scarlet berries.

2. *S. oblàta*, syn. *S. Veítchii.*—Very near the preceding, with rather larger leaves and more rounded brighter coloured berries. Both are natives of Japan, and will only flourish in favourable situations.

S. fràgrans is a form having larger panicles of sweet-scented flowers.

4. CÍTRUS.

The Oranges are shrubs or trees having alternate dotted leaves with a winged petiole jointed with the lamina. Flowers



Fig. 63. Citrus Aurantium. (⅓ nat. size.)

hermaphrodite, very fragrant. The fleshy fruit is too well known to need description. There are only about five species, from tropical Asia, but the varieties are almost interminable.

1. *C. Aurántium* (fig. 63). Common Orange. — Neither this nor any species or variety of the genus is quite hardy in this country, though in some parts of Devonshire they succeed with slight protection. Formerly, when there was less variety in ornamental shrubs, they were more frequently grown in tubs or large pots in the conservatory, and removed into the open air during the Summer months.

Order XXVIII.—SIMARÙBEÆ.

A small order of shrubs or trees closely related to the *Rutàceæ*, except that the leaves are usually alternate and destitute of immersed glands, and the cells of the ovary uniovulate. The following is the only genus coming within our province.

1. AILÂNTHUS

Leaves unequally pinnate. Flowers small, polygamous, in terminal panicles. Calyx equally 5-lobed, imbricate. Petals 5, spreading, induplicate-valvate. Disk 10-lobed. Stamens 10; in the female flower none, in the hermaphrodite 2 or 3. Fruit of 1 to 5 linear-oblong 1-seeded samaras. There are two species besides *glandulòsa*, one of which is common throughout the tropics. The native name of the following species is *Ailanto*, literally Tree of Heaven.

1. *A. glandulòsa.*—A tall handsome fast-growing tree with large pinnate deciduous leaves 1 to 2 feet long. Leaflets 9 to 25, deeply toothed or lobed. Fruit red when ripe. This is one of the most distinct and desirable of ornamental trees with pinnate foliage in cultivation, and thrives well in the neighbourhood of the sea. It is a native of Japan and Mongolia.

Order XXIX.—MELIÀCEÆ.

A considerable order of trees and shrubs, chiefly from the tropics, and only represented in our gardens by one hardy Japanese species. The principal distinctive character is in the stamens, the filaments being united in a tube with the anthers sessile or stalked within the summit.

1. MĒLIA.

Trees with alternate compound pinnate leaves and small flowers in large much-branched axillary panicles. Sepals and petals 5 or 6, the latter free, linear, contorted in æstivation. Staminal tube long; anthers within, below the summit. Fruit a fleshy drupe, 1- to 5-celled; cells 1-, rarely 2-seeded. *M. Azèdarach*, with bipinnate leaves and lilac fragrant flowers, will live in the South-west of England if protected in Winter.

1. *M. Japónica.*—An ornamental tree of recent introduction. It attains a height of 20 to 40 feet in Japan. Leaves large, bipinnate; leaflets few and distant, ovate, crenate. Flowers lilac, fragrant, in large axillary panicles.

Order XXX.—ILICÌNEÆ.

Shrubs or trees, evergreen or deciduous. Leaves simple, alternate, usually glabrous, coriaceous, entire or with prickly teeth, destitute of stipules. Flowers regular, small, white, in axillary or terminal cymes or fascicles. Calyx 3- to 5-partite, imbricate. Petals 4 or 5, hypogynous, connate at the base, spreading. Stamens 4 or 5, filaments free or slightly adhering to the base of the petals. Fruit a drupe, more or less fleshy, with 3 to 8 1-seeded stones. Besides the genus *Ilex*, containing about 145 widely-distributed species, there are two other genera: one Australasian, of three species; and one North American, with only one species.

1. ĪLEX (including *Prìnos*).

Characters of the order. *Prìnos*, the ancient Greek name for the Holly, was formerly held to be a distinct genus, founded mainly upon the greater number of stones in the berries; but the examination of a larger number of species has induced botanists to unite them. Most of the species referred to it are deciduous. *Ilex* is the Latin name applied to *Quércus Ilex*, the Evergreen Oak.

1. *I. Aquifòlium.* Common Holly.—This is undoubtedly the handsomest of indigenous evergreen trees, especially in Winter, its dark green foliage contrasting so beautifully with the bright scarlet berries. Besides the ordinary wild form there is an infinity of varieties in cultivation, some of them

very striking and others inferior to the type. Thus the varieties with white, yellow, or black berries, although interesting, are less effective than the scarlet-berried variety; and the variety called *feróx*, or Hedgehog, in which the leaves are studded nearly all over with sharp prickles, is more remarkable than pretty, and the same may be said of *feróx aùrea* and *feróx argéntea*, the Gold and Silver Hedgehog Hollies. In return, some of the gold and silver varieties are eminently deserving of cultivation, particularly some of the unarmed ones, as *aùreo-marginàta* and *álbo-marginàta*. There are also some very prettily blotched and striped varieties, both gold and silver, and with or without prickly leaves. Some of the unarmed green forms with very dark glossy green leaves, cartilaginous on the margin, are worthy of a place in every collection, including *laurifòlia*, *myrtifòlia*, *ovàta*, &c.

There are several other species of this genus in cultivation, but few equal and none excel the best varieties of the common one, and none are so hardy. Those most commonly seen are: *I. crenàta*, a small-leaved compact bush from Japan; *I. latifòlia*, also from Japan, a fine tree with very coriaceous serrated leaves about the size of those of the Cherry Laurel; *I. Dahóon*, a very variable North American shrub.

The species generally referred to *Prìnos*, in cultivation, are: *glàbra*, an evergreen shrub with small lanceolate leaves and black berries; and *verticillàta*, a deciduous shrub with ovate-lanceolate leaves hairy on the veins beneath, and sessile clusters of small white flowers followed by red berries. Both are natives of North America, where the former bears the name of Inkberry, and the latter that of Black Alder.

Order XXXI.—CELASTRÌNEÆ.

A considerable order of trees and shrubs with opposite or alternate simple leaves and minute stipules when present. Flowers very small, greenish or white. Calyx small, lobes imbricate. Petals 4 or 5, imbricate. Stamens 4 or 5, inserted on the disk, alternate with the petals. Fruit capsular (in *Euónymus*), 3- to 5-celled, dehiscing loculicidally, cells 1- or 2-seeded; seeds invested in an aril, albumen fleshy. Chiefly tropical, with the exception of the single genus included below.

1. EUÓNYMUS.

Trees or shrubs, rarely subscandent. Leaves opposite, persistent or deciduous. About forty species are known, from India, China, Japan, Europe, and North America. Name from *εὐώνῠμος*, literally, 'a good name,' but sometimes signifying the reverse. The application here seems uncertain. The deciduous species furnish nothing very ornamental, and are little cultivated. The indigenous *E. Europæus* is very pretty in Autumn, when the pale scarlet fruit is ripe, especially after it is split open, revealing the orange-coloured aril of the seeds. The Japanese species are tender, but succeed well on the south and west coasts.

1. *E. Japónicus.*—A handsome evergreen shrub about 6 feet high with oval oblong lanceolate or elliptical crenate glabrous dark green somewhat coriaceous leaves. This has given birth to some of the most splendid variegated shrubs in cultivation. The diversity of variegation is almost as great here as in the Hollies, including yellow and white and tinges of red. The names of the varieties sufficiently indicate the nature of the variegation: as, *E. Japónicus fóliis aùreo-marginàtis*, *E. Jap. fol. álbo-marginàtis*, *E. Jap. latifòlius álbus*, *E. Jap. latifòl. aùreus*, etc.

2. *E. radìcans.*—A small straggling decumbent shrub with oblong or orbicular finely serrated leaves about an inch long. The green-leaved variety does not appear to be in cultivation, but there are some pretty variegated ones of recent introduction from Japan: *E. rad. fóliis aùreo-marginàtis*, *E. rad. fóliis ròseo-marginàtis*, etc. By some botanists these forms are also considered as varieties of *Japónicus*.

The true *E. latifòlius* is a deciduous Japanese species. *E. atropurpùreus*, Burning Bush, is a small shrub with oblong acuminate finely toothed nearly glabrous membranous leaves, dark purple flowers, and scarlet smooth capsules; and *E. Americànus* has more coriaceous foliage variable in form, and scarlet prickly capsules. Both are North American.

Order XXXII.—RHÁMNEÆ.

Trees or shrubs, often spinose or glandular-pubescent, with alternate simple stipulate leaves often 3- or 5-nerved longitudi-

nally. Flowers often small and green, rarely blue, yellow, or white as in *Ceanòthus*. Calyx small, tube coriaceous, with 4 or 5 valvate lobes. Petals concave, often on long slender claws. Stamens equalling and opposite the petals. Fruit various. There are 37 genera and about 430 species of this order, from the warmer and tropical regions of the whole world.

Paliùrus aculeàtus—a branching spiny shrub with small 3-nerved leaves, minute flowers, and curious dry fruits in which the disk is enlarged, forming a circular wing—is sometimes cultivated as a curiosity under the name of Christ's Thorn; and two or three species of the curious South American genus *Collètia* are occasionally met with in collections. They are leafless spiny shrubs, some of them with remarkably thickened and flattened branches, and small white or yellowish flowers.

1. RHÂMNUS.

Evergreen or deciduous shrubs. Flowers in axillary cymes, often unisexual. Petals sometimes wanting. Disk coating the calyx-tube. Fruit a drupe, with 2 to 4 hard-shelled 1-seeded stones. A genus of sixty species, found in nearly all temperate and tropical countries except Australia. The name is said to be of Celtic origin, signifying a tuft of branches. There are two indigenous deciduous species: one, *R. cathárticus*, a spiny shrub with ovate serrate leaves; and the other, *R. Frángula*, unarmed, with obovate entire leaves; both have 3-nerved leaves.

1. *R. Alatérnus.*—An evergreen glabrous shrub with linear or ovate-lanceolate serrate shining leaves, very variable in size, and apetalous flowers. There are several varieties, differing in the size, form, and variegation of the foliage. It is a native of the South of Europe. *R. latifòlius* is merely a variety of this.

2. CEANÒTHUS.

Evergreen shrubs with alternate or rarely opposite petiolate leaves. Flowers small but numerous, in terminally thyrsoid cymes or panicles, blue, white or yellow. Fruit a 3-lobed drupe, splitting from the axis, and opening along the inner edge. Twenty-eight species have been described, all from North America, chiefly from the western coast. They are rather tender, and will only bear our winters in the south and west or against a wall. The name was applied to a spiny plant

by the Greeks, but it is only applicable to some of the species of this genus.

1. *C. azùreus.*—An erect hairy shrub. Leaves oblong, 3-nerved, serrulate, densely tomentose beneath, and often ferruginous in the wild specimens. Flowers small, blue, in lateral thyrsoid panicles. A native of Mexico, requiring protection.

2. *C. Americànus.* New Jersey Tea.—A small shrub with ovate-oblong 3-nerved serrate leaves, tomentose beneath. Flowers white, in dense clusters. *C. ovàtus* has narrower glandular-serrate glabrous leaves and larger white flowers.

3. *C. Veitchiànus.*—A very glabrous species with small oblong-obovate or oval serrate leaves and numerous dense clusters of bright blue flowers.

C. floribúndus and *C. Lobbiànus* are allied species with very hairy branches and leaves. Many other species have been introduced, but being rather tender are now only found in favoured localities.

Order XXXIII.—AMPELÌDEÆ.

Evergreen or deciduous climbing shrubs with tendrils. Leaves alternate, simple or compound. Flowers small and inconspicuous, in cymes or panicles opposite the leaves, rarely axillary. The structure of the flowers is very much as in the preceding order, except that here the calyx-lobes are imbricate in æstivation. The stamens are opposite the petals, and the latter are valvate, cohering at their tips, and falling off without separating. The fruit is a berry, often juicy, usually 2-celled, cells 1- or 2-seeded. Only 3 genera are now admitted into this family, containing about 250 species, distributed throughout the warmer and tropical regions.

1. VÌTIS (including *Ampelópsis*).

This genus includes 230 of the 250 species in this order, but very few are in cultivation for decorative purposes. The Grape Vine, *V. vinífera*, is both ornamental and useful, and will bear very good fruit in the South of England when it receives proper care and attention. The Virginian Creeper, with some allied species, was formerly separated as a distinct genus on account of the disk being confluent with the ovary or obsolete, but this character has broken down with the discovery of many new species.

1. *V. quinquefòlia*, syn. *Ampelópsis hederàcea.* Virginian Creeper.—This fast-growing climber is a general favourite, its 5-foliolate leaves being particularly handsome towards Autumn, when they change to a bright red colour. North America.

2. *V. Veítchii*, syn. *V. Japónica*, *Ampelópsis tricuspidàta.* —A Japanese species with trifoliolate leaves, which assume the same ruddy tint in Autumn. This is probably less hardy than the foregoing.

V. Labrúsca, *cordifòlia*, *vulpìna*, etc., are hardy North American species which have improved under cultivation, and produce edible fruit, and may likewise be planted for ornament.

Order XXXIV.—SAPINDÀCEÆ.

Deciduous trees or shrubs with alternate or opposite simple or compound leaves and usually polygamous flowers. Stamens unequal, or double the number of the petals, or if equal alternate with them, inserted within, upon or around the disk. Ovary 1- to 3- (rarely 4-) celled, with 1 style. Fruit variable. This order includes an assemblage of genera of somewhat heterogeneous appearance and structure to the number of 73, containing between 600 and 700 species.

Tribe I.—*SAPÍNDEÆ.*

Stamens inserted within the disk at the base of the ovary, or on one side. Ovary 3-celled. Fruit dehiscent.

1. KŒLREUTÈRIA.

Leaves alternate, imparipinnate. Flowers irregular, polygamous, yellow, in large terminal panicles. Calyx 5-partite, with valvate sepals. Petals 3 or 4, clawed, with two scales at the base, the position of the fifth or suppressed one empty. Stamens 5 to 8. Capsule vesiculate, inflated, three-lobed, dehiscing loculicidally, with 1 or 2 seeds in each cell. Named in honour of a German botanist.

1. *K. paniculàta.*—A small tree, handsome when in flower, but of rather irregular growth. The leaves are composed of about 7 or 9 deeply toothed leaflets. It is the only species known, a native of China, producing its flowers in this country in great abundance in June or July.

2. XANTHOCÈRAS.

Leaves alternate, exstipulate, imparipinnate. Flowers regular, polygamous, large, white, in terminal simple racemes; pedicels long, bracteate at the base. Sepals 5, boat-shaped, imbricate. Petals 5, elongated, clawed, without scales. Stamens 8. Capsule as large as an apple, corticate, 3-celled, with several seeds in each cell, splitting loculicidally. Name from *ξανθός*, yellow, and *κέρας*, a horn.

1. *X. sorbifòlia.*—The only species, still very rare in gardens. It is a beautiful hardy tree of small stature, with leaves resembling those of *Pỳrus Aucupária*, and white flowers with a purple eye. The spot at the base of each petal is primarily yellow, hence probably the generic name. A native of North China.

3. ÆSCULUS (including *Pàvia*).

Noble trees with opposite exstipulate digitately 5- to 9-foliolate deciduous leaves and terminal panicles or racemes of usually showy flowers. Flowers polygamous, irregular. Sepals and petals 4 or 5. Stamens 5 to 8. Capsule coriaceous, prickly or smooth, 3-lobed or globose, 3- (or by abortion 1- or 2-) celled; seeds large, resembling the fruit of the edible Chestnut. There are about fourteen species, from North America, the mountains of Central America and Asia. From *esca*, food. *Pàvia* was separated on account of the capsule being naked, but this character is uncertain and variable.

1. *Æ. Hippocástanum* (fig. 64). Horse Chestnut.—This highly ornamental tree needs no description. It is supposed to be a native of Asia, and was introduced into Europe some three centuries ago. There is a double-flowered variety, and also variegated and other varieties, differing in the leaves being more or less lobed or cut.

2. *Æ. rubicúnda*, syn. *Æ. coccínea*, *Æ. cárnea.* Scarlet-flowered Horse Chestnut.—The origin of this is obscure; by some it is averred to be from North America, and by others a garden variety of the preceding. However that may be, it is a beautiful tree, differing in its smaller stature and more rounded head from the common one. There are several varieties referred to this, but none of them probably superior to the type.

3. *Æ. Índica.*—A very handsome though still very rare tree. Leaves very large, glabrous, 7- to 9-foliolate; leaflets obovate-

lanceolate, serrate, petiolulate. Flowers numerous, in terminal thyrsoid panicles; lower petals white tinged with red, upper yellow and red bordered with white. Fruit unarmed. A native of North India.



Fig. 64. Æsculus Hippocastanum. (¼ nat. size.)

4. *Æ. glàbra.*—This species has even larger foliage than the common one, and white or greenish yellow flowers, but it is a very shy bloomer, and only desirable in a collection. Fruits either smooth or prickly. A native of North America.

Æ. Ohiotênsis and *Æ. pállida* are scarcely distinguishable even as varieties.

5. *Æ. Pàvia* (fig. 65), syn. *Pàvia rùbra.* Red Buckeye.—A small relatively slender tree with reddish flowers. There are

varieties of this named respectively *hùmilis*, *péndula*, *laciniàta*, etc. All from North America.



Fig. 65. Æsculus Pavia. (¼ nat. size.)

6. *Æ. Califórnica.*—This is the handsomest of the North American species referred to *Pàvia*. It is a tree 12 to 15 feet high, forming a dense head, which is literally covered with panicles of white highly fragrant flowers about the month of May.

Besides the foregoing, there are several other North American species occasionally grown in collections; as, *A. flàva*, Sweet Buckeye, a tree or shrub with yellowish flowers and included stamens, of which *Æ. purpurascens*, syn. *Æ. discolor*, is a variety, having the flowers tinged with red or purple; and *Æ. macrostáchya* is a shrubby species, remarkable for its long slender racemes of yellowish-white flowers.

Tribe II.—*ACERÌNEÆ.*

Flowers regular. Sepals and petals, when present, of the same number. Fruit samaroid, indehiscent.

4. ÀCER.

Trees or shrubs with opposite deciduous palmately lobed or divided leaves and small polygamous racemose flowers. Disk annular, fleshy, lobed. Fruit of two spreading samaras with long wings. About fifty species, inhabiting the temperate regions of the North. The ancient Latin name of the Maple. Many of the species are very ornamental rapid-growing trees.

1. *A. campéstris.* Common Maple.—This is the only indigenous species, rarely seen as a tree, though commonly seen in hedgerows in the South of England. The leaves are reniform and 5-lobed; lobes acute or obtuse in different forms. The bark is corky.

2. *A. Pseudoplátanus.* False Sycamore.—This has been so extensively planted as to appear wild in many localities. It is a native of Central Europe and West Asia. A fast-growing handsome tree, valuable for planting in bleak places near the sea, etc. The ordinary form is too well known to need description, but there are some varieties we must allude to, viz.: *variegàtum* in which the leaves are irregularly striped with yellow, *purpuráscens* with leaves of a purplish tinge, and *erythrocárpum* with red fruits.

3. *A. Monspessulànum.*—A handsome small tree with a rounded head. The leaves are comparatively small, coriaceous, shining, and palmately 3-lobed; lobes very obtuse. This tree has a very pretty appearance in Spring when clothed with its yellowish-green flowers before the leaves are fully developed. It is a native of Central Europe, and quite hardy in Britain.

4. *A. eriocárpum*, syn. *A. dasycárpon.*—A very rapid-growing ornamental tree from 70 to 90 feet high with large deeply 5-lobed and toothed leaves bright green above and silvery white beneath, which assume a pretty yellow tint in Autumn. Flowers in umbellate clusters preceding the leaves. Fruit large, densely hairy when young, eventually glabrous. A North American species.

5. *A. rùbrum.* Curled Maple.—A large tree with ample foliage. Leaves 3- to 5-lobed, with acute sinuses and irregular teeth, pale underneath. The flowers are red or scarlet, and are produced in great profusion in Spring before the appearance of the leaves. Fruit-lobes nearly erect. There are varieties in which the foliage is variegated with white or yellow. North America.

6. *A. saccharìnum.* Sugar Maple or Bird's-eye Maple.—

A smaller tree than the two last, and less beautiful, but of far greater economic utility, furnishing an abundance of sugar from its sap, and also a very handsome wood, much prized for interior work and cabinet making. The leaves are 3- or 5-lobed; lobes with rounded sinuses and remote teeth, slightly hairy beneath. Flowers appearing with the leaves. Wings of the fruit nearly erect. *A. nìgrum* is a slightly different variety. North America.

7. *A. Pennsylvánicum*, syn. *A. striàtum*. Snake Maple.—A very distinct small tree with 3-lobed finely-toothed leaves, lobes narrowly acuminate. Flowers greenish, in long drooping racemes, appearing after the leaves. Fruit large, with spreading wings. The stem of this small tree is prettily striped with light or dark lines. North America.

8. *A. circinàtum*.—A shrubby species with roundish cordate 7- to 9-lobed serrulated leaves, reddish umbellate flowers and fruits. A native of North-western America.

9. *A. polymórphum*, syn. *A. palmàtum*, *A. dissèctum*, and *A. septemlòbum*.—This handsome Japanese species includes some of the most elegant varieties in cultivation. They vary in foliage from palmately 5-lobed leaves with toothed undivided lobes to deeply 7- or 9-lobed, with more or less finely cut divisions. There are also some extremely fine variegated and purple-leaved forms. In all its forms this is a tree of small stature and regular outline, having slender branches and numerous purplish flowers followed by spreading oblong samaras.

10. *A. Cólchicum rùbrum*.—This is the *A. Mòno* or *làtum*. The leaves are from 5- to 7-lobed and quite glabrous; lobes triangular or oblong, entire, acuminate; petioles long and slender. Flowers appearing with the leaves. Fruit-lobes large, spreading. *A. pìctum* is a variety variegated with white. The name *rùbrum* refers to the colour of the young twigs.

11. *A. platanoìdes*. Norway Maple.—This is one of the handsomest and hardiest species, resembling the Plane in its noble foliage. Leaves 5-lobed, lobes more or less toothed or laciniate. Flower-corymbs erect. There are several varieties of this in cultivation, including the Eagle's or Kite's Claw, *A. cucullàtum* and *laciniàtum*, *Lobèlii*, *variegàtum*, &c.

12. *A. Tatáricum*, syn. *cordifòlium*.—A shrub or small tree with oblong-cordate leaves irregularly sharply toothed or rarely lobed. Flowers small, paniculate, appearing with the

leaves. Fruit red. A native of South-eastern Europe, the Caucasus, etc.

5. NEGÚNDO.

This genus is sometimes united with the Maples; it differs only in the absence of a disk in the dicœcious flowers, and in having pinnate leaves. There are only two or three species known, natives of Japan and North America. The etymology of the word is obscure.

1. *N. fraxinifòlium*, syn. *N. aceroìdes*, *Acer Negúndo.* Box Elder or Ash-leaved Maple.—A small tree with opposite pinnately 3- or 5-foliolate deciduous leaves; leaflets petiolulate, lanceolate, variously lobed or toothed. This is best known by the variety *fòliis variegàtis*, which is one of the handsomest variegated shrubs of the deciduous class in cultivation, having the leaves beautifully striped with white and green, and possessing the merit of being a vigorous grower. There are some other variations of this species, but none so good as the above. Native of North America.

Tribe III.—*MELIÁNTHEÆ.*

Flowers hermaphrodite. Stamens inserted within the disk at its base. Leaves alternate, pinnate, stipulate.

6. MELIÁNTHUS.

Shrubs with unequally pinnate leaves and terminal or axillary racemes of dark purple flowers. Calyx gibbous and oblique at the base. Petals 5, excentric, one very small or wanting, declinate, narrow, on long claws, and hairy in the middle. Disk fleshy, one-sided. Stamens 4, hypogynous. Capsule membranous, 4-lobed, 4-celled; cells 1-seeded; seeds albuminous. About four species are known, all from South Africa. The name is from μελί, honey, and ἄνθος, a flower, referring to the large quantity secreted in the flowers.

1. *M. màjor.*—An elegant shrub with glaucous coarsely toothed leaflets and huge spikes of dark purple flowers. This is killed to the ground every winter, but is nevertheless well suited for planting in sheltered situations.

Tribe IV.—*STAPHYLÈÆ.*

Flowers hermaphrodite. Stamens inserted at the base of

the outside of the disk. Leaves stipulate, opposite, pinnate, or 3- to 5-foliolate.

7. STAPHYLÈA.

Deciduous branching shrubs with small pentamerous white flowers in drooping axillary racemes or panicles. Fruit capsular, inflated, membranous, 2- or 3-lobed and 2- or 3-celled, with 1 or more albuminous seeds in each cell. About four species, in temperate Asia, North America, and Europe. The name is derived from *σταφυλή*, a bunch or cluster.

1. *S. pinnàta.* Common Bladder-nut.—A shrub 6 to 8 feet high with imparipinnate leaves of 5 or 7 lanceolate glabrous leaflets. Flowers white, racemose. Fruit membranaceous, vesiculose. Central Europe.

2. *S. trifoliàta.* American Bladder-nut.—Differs from the preceding in its larger white flowers and trifoliolate leaves.

Order XXXV.—ANACARDIÀCEÆ.

A large order of trees and shrubs, chiefly from tropical countries. Leaves usually alternate, pinnate, trifoliolate or simple. Flowers hermaphrodite or polygamous. Ovary usually 1-celled, with a solitary ovule pendulous from a funicle rising from the base of the ovary.

1. RHŬS.

Trees or shrubs abounding in resinous or caustic juice. Leaves simple, trifoliolate or imparipinnate. Flower inconspicuous, in axillary or terminal panicles, polygamous. Calyx small, 4- to 6-partite; lobes equal, imbricate. Petals 4 to 6, spreading. Stamens 4 to 6 or 10. Fruit a 1-seeded berry. A genus of about 120 species from the warmer parts of the whole world. The name is derived from a Celtic word signifying red, the colour of the fruits of some species. The number grown for ornamental purposes is very limited. *R. Coriària* furnishes the Sumach of commerce.

1. *R. Cŏtinus.* Wig Tree or Venetian Sumach.—A shrub about 6 feet high with simple glaucous entire obovate or rotundate leaves narrowed at the base and on long petioles, and a feathery inflorescence. The flowers are small, but the transformation of some of the pedicels and hairs into white feathery awns imparts a very peculiar appearance to the

inflorescence. This and the next are the only species commonly cultivated in this country. A native of the South of Europe. It furnishes the dye called Young Fustic.

2. *R. typhìna.* Stag's-horn Sumach.—This is the commonest species in gardens, and spreads very rapidly by suckers. It is a handsome shrub or small tree with large hairy pinnate leaves and densely hairy thick shoots. Leaflets 9 to 25, glaucous beneath, sessile, lanceolate, acuminate, deeply serrate, the veins prominent below and as well as the main rachis clothed with fulvous hairs. Flowers greenish yellow or red, in dense clusters. A native of North America, eminently suited for planting near the sea.

3. *R. glàbra*, syn. *R. élegans.*—Similar to the last, with glabrous somewhat glaucous leaves, whitish beneath. The berries are bright red, and a variety in which they are unusually brightly coloured is called *coccínea.* A native of North America.

R. succedànea and *R. vérnix* are Japanese species of recent introduction with handsome pinnate leaves. *R. Toxicodéndron*, Poison Ivy, is a very venomous North American species, half-scandent in habit, with trifoliolate leaves and white berries.

2. PISTÁCIA.

Small trees or shrubs abounding in resinous secretions, with pinnate leaves, with or without a terminal leaflet, or sometimes trifoliolate, and small apetalous dicœcious flowers in axillary clusters. Fruit a dry 1-seeded drupe. There are about six species, from the Mediterranean region and Mexico. The name is an altered form of the Arabic appellation. The Mastich and Turpentine trees require protection in this country, but as they possess no ornamental features, they are rarely seen in any except botanic gardens. Several species furnish galls, employed in dyeing.

P. Lentíscus. Mastich. A small tree with paripinnate evergreen leaves and a winged petiole. A native of the shores of the Mediterranean Sea.—*P. vèra.* Pistachio Nut. A deciduous-leaved species. Leaves composed of 2, 3, or 5 ovate leaflets. This is extensively cultivated in the South of Europe for its edible nuts.—*P. Terebínthus.* Turpentine Tree. Leaves imparipinnate; leaflets about 5, lanceolate. Also from the Mediterranean region.

Order XXXVI.—CORIÀRIEÆ.

This order consists of one genus and about six species, rather widely dispersed, occurring on the shores of the Mediterranean, through the mountains of Northern India to Japan, and in New Zealand and South America.

1. CORIÀRIA.

Unarmed shrubs with simple opposite 1- to 5-nerved leaves and small green axillary flowers. Disk none. Sepals 5, persistent, membranous on the margin. Petals 5, hypogynous, shorter than the sepals, fleshy, keeled on the inside. Stamens 10. Carpels 5 to 10, distinct, more or less fleshy, with one pendulous seed in each. The name is from *corium*, a covering or hide, from the crustaceous carpels.

1. *C. myrtifòlia.*—This is a handsome shrub from 3 to 6 feet high. Leaves ovate-lanceolate, entire, 3-nerved, glabrous and glaucous; petioles very short. Flowers inconspicuous. A native of the Mediterranean region.

Order XXXVII.—LEGUMINÒSÆ.

Sub-Order I.—Papilionàceæ.

Trees, shrubs, or herbs of very diverse habit. Leaves bistipulate, alternate, rarely opposite, pinnate, digitate, or more rarely simple; leaflets entire, lobed or toothed, sometimes stipellate. Inflorescence various. Flowers irregular, usually hermaphrodite. Sepals normally 5, more or less united, the fifth lobe anterior, the two posterior sometimes combined, forming a bilabiate calyx. Petals 5, unequal, imbricate, erect, rarely spreading; the upper one (standard) free, broad, often reflexed; the two lateral (wings) enclosing and sometimes adhering to the two lower (keel), rarely smaller; the two lowest inside the others and usually more or less united and curved upwards. Stamens 10, perigynous; filaments united in a sheath, or the upper one free or rarely all free. Fruit a 1-celled pod, dehiscent along one or both sutures, or rarely indehiscent, sometimes transversely septate; seeds 1 or more, inserted on the ventral

suture, exalbuminous. As thus characterised this includes only one sub-order; but altogether the order includes some 400 genera and 6,500 species.

Tribe I.—*PODALÝRIEÆ.*

Shrubs, rarely herbs. Leaves simple or digitate. Stamens 10, free.

1. PIPTÁNTHUS.

Standard orbicular, slightly exceeding the wings, the sides reflexed; wings oblong-obvate; keel petals as long or longer than the wings, scarcely incurved, connate at the back. Pod stalked and many-seeded; seeds minutely strophiolate. One shrubby species, a native of the Himalayas. From *πίπτω*, to fall, and *ἄνθος*, a flower, in allusion to all parts of the flower dropping together.

1. *P. Nepalénsis.* Evergreen Laburnum. — A handsome evergreen shrub requiring a sheltered situation. Leaves alternate, petiolate, digitately trifoliolate; leaflets lanceolate, acute, slightly hairy; stipules united in one, opposite the leaves. Flowers large, yellow, in terminal bracteate racemes.

2. THERMÓPSIS.

Calyx shortly turbinate at the base. Petals nearly equal. Pod sessile or shortly stalked, linear or oblong, inflated, valves slightly coriaceous. Herbs with creeping rhizomes. Leaves digitately trifoliolate; stipules foliaceous, free. About twelve species are described, all inhabiting the north temperate zone. The name is compounded from the Greek *θέρμος*, a lupine, and *ὄψις*, appearance or resemblance.

1. *Th. fabàcea.*—A pretty erect herbaceous summer-flowering plant somewhat woody at the base, about 2 feet high. Leaflets ovate-lanceolate, hairy beneath. Flowers yellow, about an inch across, in terminal loose racemes. Siberia.

3. BAPTÍSIA.

Calyx obtuse or scarcely turbinate at the base. Petals almost equal, the carinal connate at the back. Pod stalked, ovoid or globose, inflated, often coriaceous. Leaves digitately trifoliolate, or simple and sessile, or perfoliate. A North American genus of about fourteen species of no particular interest, and rarely seen in cultivation. Name from *βάπτω*, to dye, some species being used for this purpose.

1. *B. tinctòria.*—A dwarf perennial with slender stems about 18 inches high and scattered trifoliolate leaves; leaflets suborbicular. Flowers yellow, in terminal loose racemes, appearing in Summer.

2. *B. álba.*—A taller plant, more densely clothed with foliage; leaflets oval. Flowers white.

3. *B. austràlis.*—Similar to the last, with lanceolate leaflets and blue flowers. Both this and the last flower in early Summer.

Tribe II. - *GENÍSTEÆ.*

Shrubs or herbs. Leaves simple or digitately compound; leaflets quite entire. Stamens 10, monadelphous.

4. LUPÌNUS.

A large genus of very ornamental annual or perennial plants, rarely frutescent. Leaves 5- to many-foliolate, rarely trifoliolate; stipules adnate to the base of the long petiole. Flowers variable in colour, blue lilac yellow or white, in terminal racemes. Calyx 2-lipped. Wing petals connate at the tips; keel terminating in a curved beak. Pod flat, coriaceous or fleshy. Upwards of eighty species have been described, chiefly from temperate North America, a few tropical, and a few species from the Mediterranean region. From *lupus*, a wolf or destroyer, though the application is not clear. Very few of the species are in general cultivation, but a great many handsome varieties have resulted from intercrossing.

Perennial Species.

1. *L. polyphýllus* (fig. 66).—Herbaceous, about 5 or 6 feet high, leaflets very numerous, with immense racemes of usually dark blue flowers, though variable in this respect, and often with a mixture of white. This is the commonest and at the same time one of the best species in cultivation. Native of North-western America.

2. *L. mutábilis.*—A rather tender herbaceous species, from the Andes of Bogota. A strong-growing plant about a yard high. Leaflets 7 to 9, linear-lanceolate. Flowers very fragrant like the Sweet Pea, variable and changeable in colour, when first open nearly white, and at length with tinges of yellow and purple.

3. *L. tomentòsus.*—A beautiful hirsute species; leaflets 5 to

9, lanceolate. Flowers variable: pink, white, yellow, purple, blue, in different hues and combinations. Andes of Peru.



Fig. 66. Lupinus polyphyllus. (¼ nat. size.)

Annual Species.

4. *L. lùteus.*—A dwarf species with bright yellow fragrant flowers, from the Mediterranean region.

5. *L. nànus.*—This is the common Dwarf Annual Lupine,

with 5 to 7 narrow lanceolate acute hairy leaflets and normally lilac and blue flowers. There are, however, variously coloured varieties of this and *L. affìnis*, including white, yellow, various shades of violet and blue in different combinations. A native of California.

6. *L. vàrius.* A Mediterranean species with variable but usually dark blue flowers.

Many more species might be included, but this would serve no useful purpose, especially as there is great confusion in the nomenclature.

5. ADENOCÁRPUS.

A small genus of dwarf branching shrubs closely allied to *Cỳtisus*, but distinguished from that and the neighbouring genera by the linear compressed pod being clothed with glandular prickles; hence the name, from *ἀδήν*, a gland, and *καρπός*, a fruit. All, except one or two tropical African species, from the Mediterranean region. The species are rarely seen in gardens, and only hardy in the South-west of England.

1. *A. intermèdius.*—Leaves small, trifoliolate. Flowers yellow, racemose, very much resembling those of the smaller flowered Brooms. Spring.

6. LABŬRNUM.

Technically distinguished from the neighbouring genera by the stalked pod with fleshy or winged sutures and estrophiolate seeds. Three species only are referred to this genus, from the South of Europe and Asia Minor. The ancient Latin name.

1. *L. vulgàre* (fig. 67), syn. *Cỳtisus Labŭrnum.* Common Laburnum.—This showy flowering tree is probably more familiar than some of our native trees, and certainly nothing can exceed the beauty of the pendulous racemes of bright yellow flowers with which it is so profusely clothed during the month of May. There are several varieties in cultivation, which differ from the ordinary type in having larger flowers, in the form of the foliage, etc. *Alschingèri*, *autumnàle*, *crìspum* and *Párksii*, are amongst the best of the many varieties in cultivation.

The Purple Laburnum, *L. Adàmi*, is a hybrid between this and *Cỳtisus purpúreus.* The flowers are of a dull purplish colour, in long pendulous racemes like the common one, and

the leaves have rather shorter petioles; but the most remarkable thing in it is the complete reversion of some parts of the same tree to one or the other of the parents. Thus the three forms may be seen growing on one stem, having the appearance of being grafted upon it. The hybrid is sterile, but the parent reversions fertile.



Fig. 67. Laburnum vulgare. (¼ nat. size.)

2. *L. alpìnum.* Scotch Laburnum.—Very similar to the preceding, and some of the varieties in cultivation appear to partake of the characteristics of both. This differs from No. 1 in the pod being quite glabrous, distinctly stalked, and winged along the upper suture. It is also of larger growth, quickly forming a tree from 20 to 30 feet high. A native of South-eastern Europe. *L. péndulum* and *confértum* are varieties.

3. *L. ramentàceum*, syn. *L. Weldèni.*—The racemes in this species or variety are sub-erect, and it is of dwarf shrubby habit, with very hairy leaves. A native of Dalmatia. A variety called *serótinum*, Autumn-flowering Laburnum, is referred to this species.

7. GENÍSTA.

Dwarf prickly or unarmed shrubs with 1-foliolate leaves or

none, very rarely 3-foliolate. Calyx campanulate, the upper lobes free or connate. The claws of the lower petals connected with the staminal tube. Keel usually bent downwards. Pod short or long, flat or swollen. About seventy species are described, inhabiting Europe, North Africa, and Western Asia. Some derive the name from the Celtic *gen*, a bush; and others from the Latin *genu*, a knee.

1. *G. álba*, syn. *Spártium álbum*, *S. multiflòrum*, and *Cỳtisus álbus*. Portugal Broom.—A handsome species growing about 4 to 6 feet high, with numerous slender slightly furrowed erect branches and few scattered leaves of 1 or 3 small hairy leaflets. Flowers very abundant, white or pink, produced from May onwards for a considerable period. A native of Spain and Portugal, and the most desirable of its class.

2. *G. sagittàlis*.—This is a very peculiar and interesting plant, in which the leaves are replaced by a foliaceous or winged jointed stem. It grows about a foot high, and bears terminal erect few-flowered racemes of yellow flowers in May or June.

3. *G. tinctòria*. Greenweed.—A native species and one of the handsomest. A spineless shrub from 1 to 2 feet high with unifoliolate nearly glabrous leaves and a profusion of yellow flowers from July till September. There is a good double-flowered variety of this.

4. *G. radiàta*, syn. *Spártium radiàtum*.—A slender shrub about 18 inches high with opposite branches, 3-foliolate leaves, narrow leaflets, and terminal heads of yellow flowers. A native of Italy, flowering in Summer.

8. SPÁRTIUM.

As here limited, this genus consists of only one species. It differs from *Genísta* in having a spathaceous calyx, with the two upper short teeth free, and the three lower united into a lip, the keel incurved, and the pod narrower. The name is from σπάρτον, the Greek appellation of this or a similar plant, and the cord made from it.

1. *S. júnceum*, syn. *Genísta Hispánica*, *Spartiánthus júnceus*. Spanish Broom.—This shrub is a very old inhabitant of English gardens. It very much resembles the Common Broom, but the slender twiggy branches are terete and not angular, and usually leafless. The few leaves produced are 1-foliolate, small, and linear-lanceolate. Flowers large, yellow,

fragrant, in terminal racemes, appearing in July or August. A handsome double variety is in cultivation. This plant is found in the countries bordering the Mediterranean and in the Canary Islands.

9. ŬLEX.

These prickly bushes are distinguished in their floral characters from allied genera by having a coloured bipartite calyx with the upper lobe of two teeth and the lower of three minute teeth. The spines of these shrubs are transformed leaves. The etymology of the name has not been satisfactorily explained.



Fig. 68. Cytisus scoparius. (¼ nat. size.)

1. *U. Europæus.* Furze, Gorse, or Whin.—The double variety of this plant is one of the most beautiful yellow-flowered shrubs we have, especially for planting in soil where little else would thrive. The Irish Furze (*U. strictus*) is an erect, more slender, less rigid form of this species.

2. *U. nànus.*—Another indigenous species, of very dwarf habit, flowering in Summer and Autumn. The bracts at the base of the calyx are very minute in this species compared with the preceding.

3. *U. Hispánicus.*—A dense dwarf spreading bush in which the branches and pliable spines are very long and slender. The yellow flowers are produced very freely in Spring.

10. CŸTISUS.

Shrubs, rarely spiny. Leaves usually 3-foliolate, sometimes 1-foliolate, or wanting. Calyx

more or less two-lipped. A considerable genus, nearly all the species from the Mediterranean region. The origin of the name is obscure.

1. *C. scopàrius* (fig. 68), syn. *Genista*, *Spártium* and *Sarothámnus*. Common Broom.—This is common throughout Britain, varying from 2 to 6 feet in height according to situation, etc. The slender branches are silky, hairy, and angular, and the flowers bright yellow, in May or June. The most remarkable characteristic of this species is the spirally coiled style. There are several varieties, including a white and a double-flowered variety.

2. *C. purpùreus.*—A glabrous shrub about 3 feet high with slender ascending or pendulous branches and 3-foliolate leaves. Leaflets obovate. Flowers lateral, usually two together, dull purple, rosy purple, or white. This species, crossed with the Common Laburnum, gave rise to the remarkable hybrid alluded to above; but writers are by no means agreed as to the origin of it. Some assert that it is a graft-hybrid, while others incline to the more probable opinion that it is of sexual origin.

3. *C. nìgricans.*—A pretty shrub about 3 feet high with small 3-foliolate leaves and terminal erect racemes of yellow flowers. This is one of the most ornamental of this group, bearing racemes of flowers about 6 inches long in June and July. It is a native of Austria.

Amongst others in cultivation are: *C. capitàtus*, a very hairy species with the flowers in a dense terminal head; *C. argénteus*, with silvery foliage and axillary yellow flowers; and *C. sessilifòlius*, with sessile leaves and terminal yellow flowers.

Tribe III.—*TRIFÒLIEÆ.*

Herbs, rarely shrubs. Leaves pinnately (rarely digitately) 3-foliolate; veins usually ending in teeth. Upper stamen usually free.

There are scarcely any species of this tribe grown for decorative purposes, though some of the Clovers are highly ornamental. The best are *Trifòlium rùbens*, dark red; *T. élegans*, pink; *T. ochroleùcum*, yellowish white; and *T. incarnàtum*, an annual, bright scarlet. The genus *Medicàgo* is remarkable for the great diversity in the form of the pods in different species. It is spirally twisted, resembling a shell, and variously sculptured or furnished with spines, or quite plain.

Tribe IV.—*LÒTEÆ.*

Herbs or undershrubs. Leaves pinnately divided; leaflets 3 or more, entire. Flowers capitate or umbellate. Upper stamen free, or not; alternate filaments often dilated.

11. ANTHŸLLIS.

Trailing herbs or shrubs. Flowers usually capitate, yellow, white, purple, or red. Calyx tubular or inflated, including the 1- or few-seeded pod. Stamens usually monadelphous. About twenty species are known, chiefly from the countries bordering the Mediterranean Sea. The Greek name.

1. *A. Bárba-Jòvis.* Jupiter's Beard.—A tender evergreen shrub about 3 feet high with pinnate leaves and yellow flowers. A handsome silvery shrub rare in cultivation, and requiring protection in very severe weather.

2. *A. Vulnerària.* Woundwort.—An indigenous herbaceous trailing species. Leaves and stems clothed with silky hairs. Leaflets 3 to 7, linear-oblong. Flowers capitate, varying in colour from white and cream to purple and crimson.

12. LÒTUS.

Procumbent herbs or undershrubs. Leaflets 4 or 5. Flowers umbellate on axillary peduncles. Calyx-lobes often longer than the tube. Keel beaked. Upper stamens free. Pod oblong or linear, terete, turgid or flat. Of the fifty or more species there are only a few worthy of cultivation.

1. *L. corniculàtus.* Bird's-foot Trefoil.—Some of the varieties of this very common native plant are very pretty for covering rock-work, &c., especially the double-flowered variety. *L. Jacobæus* is the dark-purple-flowered species, formerly more cultivated than at present. It is a native of the Cape de Verde Islands, and therefore too tender to withstand our winters; but it may be treated as an annual. *L. Gebèlia*, a taller growing species, growing in dense tufts, with glabrous and glaucescent foliage and rosy-carmine flowers. Native of Syria. *L. purpùreus* and *siliquòsus* (*Tetragonolòbus*) are remarkable for their ample foliage, purple and yellow flowers, and 4-winged pods.

Tribe V.—*GALÈGEÆ.*

Herbs, not climbing, or erect or climbing shrubs, rarely trees. Leaves pinnate. Flowers solitary, racemose, or paniculate. Stamens 10, usually diadelphous. Pods 2-valved, rarely small and indehiscent or inflated.

13. AMÓRPHA.

A small genus of North American deciduous shrubs with imparipinnate leaves and small purple or white flowers disposed in dense terminal racemose panicles. Only one petal, the upper, is developed in this genus, the others are wanting, hence the generic name.

1. *A. fruticòsa.* Bastard Indigo.—This is the only species at all common in gardens. It is a shrub about 6 to 9 feet high, with elegant pinnate leaves and purple flowers. There is a narrow-leaved and a small-leaved variety, and one with bluish flowers.

14. GALÈGA.

Tall erect perennial herbs. Leaves imparipinnate, leaflets entire; stipules semi-sagittate. Flowers white or blue, in terminal and axillary racemes. Stamens monadelphous. Style smooth. Legume linear, terete, continuous within. There are three species, from the South of Europe and Western Asia. The name is from γάλᾰ, milk, on account of the herbage being supposed to increase the milk of goats, &c., and hence the English name of Goat's Rue.



Fig. 69. Galega orientalis. (¼ nat. size.)

1. *G. orientàlis* (fig. 69).—About a yard high, with blue flowers appearing in July. Caucasus, &c.

G. officinàlis grows about 4 or even 5 feet high, with lanceolate acute leaflets and pale blue or white flowers. *G. bilòba* has the leaves bifid at the tip and pale purple flowers, and *G. Pérsica* has oval or oblong mucronate glaucescent leaves and white flowers.

15. WISTÀRIA.

Tall climbing deciduous shrubs with imparipinnate leaves and terminal pendulous racemes of bluish flowers. The two upper teeth of the calyx short and subconnate, the inferior longer. Standard large. Stamens diadelphous, or the vexillary united with the others at the middle. Pod elongated, twisted; valves scarcely coriaceous, dehiscent; seeds reniform, estrophiolate. About four or five species are known, one from North America and the rest from China and Japan. So named in honour of an American botanist. Some of the species were formerly erroneously referred to the genus *Glycìne*.

1. *W. Sinénsis* (fig. 70), syn. *W. consequàna*.—Nothing



Fig. 70. Wistaria Sinensis. (¼ nat. size.)

can exceed the beauty of this magnificent climbing shrub when in full flower, towards the end of April or in the beginning of

May, before the leaves are fully developed. This is the only species common in gardens, and by far the handsomest known. In the South of England it attains great perfection on a trellis or pillar, but in the North it requires the protection of a wall. There is a white-flowered variety, but the ordinary purplish-lilac one is the better of the two. A native of China.

2. *W. frutéscens.*—This is, perhaps, hardier than the preceding, but, although introduced many years previous to that, it is still far less generally cultivated, on account of its inferiority as an ornamental plant. It is altogether a smaller species, with darker flowers of a violet tinge; but as it does not blossom till Autumn, both should be grown where there is space. A variety called *magnífica* exceeds the old form in beauty. A native of North America.

3. *W. brachybótrys.*—A more erect shrub with slender sarmentose branches and ovate or cordate leaflets, silvery when young. The flowers are larger and of deeper violet, in closer shorter racemes than in the above species, and they are produced in Spring with the leaves. A native of Japan.

W. multijùga is a native of Japan, of quite recent introduction.

16. ROBÍNIA.

Deciduous trees or shrubs, often spiny, with imparipinnate leaves and axillary racemes of white, rose, or purple flowers. Standard large and broad, naked within; wings oblong-falcate, free; keel incurved, obtuse. Vexillary stamen connected with the others at the middle. Pod linear, the upper suture narrowly winged, valves thin. About five or six species, all North American. Named after M. Robin, a French botanist.

1. *R. híspida* (fig. 71). Rose Acacia.—A small shrub having the young branches and petioles densely clothed with bristles. Leaflets oblong or oval, entire, midrib terminating in a fine bristle. Flowers larger than in the following, rose or pink. A variable plant with regard to the size of the leaves and colour of the flowers, and in one variety the characteristic bristly hairs are wholly wanting. A native of North America.

2. *R. Pseud-acácia.* Thorn or False Acacia.—A tall rapid-growing tree with long slender smooth shoots and the stipules usually transformed into strong rigid sharp spines. The ordinary form has from 9 to 21 oblong or oval leaflets, and white odoriferous flowers slightly tinged with pink. But there are about a hundred varieties, and the extreme forms are widely

different in aspect. In *R. Ps. inérmis* the characteristic thorns are wanting, and the leaflets are narrow, oblong, and glaucous



Fig. 71. Robinia hispida. ($\frac{1}{3}$ nat. size.)

beneath; *Decaisneàna* has bright rosy flowers; *monophýlla* has the leaf reduced to one large leaflet; *péndula* is of drooping habit; and *crispa*, *monstròsa*, and *dissécta* differ in the foliage. Besides the above there is a yellow-flowered variety, and others in which the leaflets are much smaller or larger than in the so-called typical form. Then there is the variety *tortuòsa* with zigzag branches, and varieties variegated with white or yellow.

3. *R. viscòsa*, syn. *R. glutinòsa*.—A small tree. Young shoots clammy. Flowers rose-pink, nearly scentless, crowded in short racemes; pod clothed with glandular hairs. Possibly one of the many variations of the Thorn Acacia. North America.

17. CLIÁNTHUS.

Trailing or climbing herbs. Leaves imparipinnate; leaflets small, numerous, oblong. Flowers very large, brilliantly coloured, in short pendulous axillary racemes. Petals acuminate; standard reflexed. Stamens diadelphous. Only two species are described, but these have produced several varieties. The name is a compound of *κλεῖος*, glory, and *ἄνθος*, a flower, from whence we have Glory Pea.

1. *C. puníceus*. Parrot Flower.—A branching shrubby

plant clothed with appressed silky hairs. Flowers scarlet; keel large, boat-shaped, with a long beak. This is the hardier species of the two, and will flower freely in the South with the protection of a wall and a slight covering in Winter. It varies in the colour and size of the flowers. This species is from New Zealand.

2. *C. Dampiéri.*—An extremely handsome species from Australia, more properly a greenhouse plant. Whole plant densely villous. Flowers 4 or 5 inches across when expanded, red with a black or dark purple blotch at the base of the standard. There are several varieties in cultivation, of which *marginàtus* is perhaps the finest. In this the ground is white bordered with red and the spot black.

18. COLŪTEA.

Shrubs with imparipinnate leaves and yellow or reddish flowers in axillary racemes. The stipitate membranaceous inflated pod is the main character of the genus. There are about seven or eight species, from the Mediterranean region and tropical Asia. The name is from *κολουτέα*, which was given to a plant by the ancients.

1. *C. arborèscens.* Bladder Senna.—This is the only species familiar in gardens, having yellow flowers and bladder-like pods. It is a native of the South of Europe.

19. HALIMODÉNDRON.

A genus of one shrubby species. Leaves abruptly pinnate. Flowers pink, rather large, umbellate, axillary, or fascicled on the old nodes. Pod stalked, very turgid, thickly coriaceous. From *ἅλιμος*, saline, and *δένδρον*, a tree, from the nature of its habitat.

1. *H. argénteum.*—Foliage usually covered with a silvery down. Leaflets few, the upper ones sometimes reduced to prickles. A very pretty shrub, especially when grafted upon the Laburnum as a standard. A native of Russian Asia.

20. CARAGÀNA.

Trees or shrubs. Leaves abruptly pinnate, often fascicled, the rachis usually terminated by a bristle or rigid prickle. Stipules often spinescent. Flowers yellow, rarely white or red; peduncles 1-flowered, seldom 2- or 3-flowered, fascicled on the old nodes or axillary. Calyx gibbous above. Pod

linear, ultimately terete or turgid. About fifteen species, all Asiatic. Karagan is the name *C. arboréscens* bears amongst the Mogul Tartars. The species are very hardy.

1. *C. arboréscens.*—A shrub or small tree. Leaves composed of 8 to 10 oblong mucronate leaflets; common petiole deciduous, stipules scarcely spinescent. Flowers pale or bright yellow according to the variety, appearing in early Spring. A very desirable shrub on account of its extreme hardiness. *C. sophoræfòlia* is a form of this with smaller membranous leaves. A native of Siberia.

2. *C. Altagàna*, syn. *C. microphýlla.*—Of smaller stature than the foregoing, with smaller more numerous leaflets clothed with appressed hairs, and thorny stipules. The flowers, rather larger, are usually solitary. Also from Siberia, and flowering in Spring.

3. *C. Chamlàgu.*—A dwarf spreading shrub. Leaflets glabrous, mucronulate, in two distant pairs, the upper larger; stipules mostly spinescent. Flowers solitary, dirty yellow, ultimately assuming a reddish tinge, appearing in June. A native of North China, where it bears the specific name.

4. *C. frutéscens.*—Near the last, but of more ancient cultivation. It is of erect habit, with two pairs of contiguous equal leaflets. Flowers solitary, yellow, on jointed peduncles. There are varieties under the names *angustifòlia*, *latifòlia*, &c., in cultivation. A native of Siberia, flowering in May.

There is another group of species in which the common petiole is persistent and thorny. *C. triflòra* and *C. pýgmæa* are the species usually seen. The former has 6 or more pairs of leaflets and 2 or 3 flowers on a common peduncle; and the latter solitary flowers and 2 pairs of leaflets.

21. CALOPHÀCA.

Shrubs or herbs. Leaves imparipinnate; leaflets quite entire. Flowers rather large, yellow or violet, axillary, solitary, sub-umbellate or racemose. Standard petal obovate or orbiculate, keel petals about equalling the wings. Upper stamen free. Pod linear or oblong, often acute. About seven species, all Asiatic. The name is a compound of *καλός*, beautiful, and *φακῆ*, a lentil.

1. *C. Wolgárica.*—A dwarf branching shrub clothed with glandular hairs. Leaves pinnate, often crowded; leaflets

roundish, entire, mucronate. Flower-spikes on long peduncles; flowers yellow. Siberia.

22. ASTRÁGALUS.

A very extensive genus of herbs or dwarf often spiny shrubs with unequally pinnate leaves and racemose or spicate seldom umbellate flowers. Calyx tubular; teeth 5, nearly equal. Petals narrow, with long claws. Pod usually 2-celled longitudinally by the intrusion of a thin membrane from the dorsal suture. There are between 500 and 600 species, or, according to a recent monograph by Bunge, 900 to 1,000, chiefly from Russian Asia, the Himalayas, and Asia Minor, and extending throughout the Mediterranean region, the mountains of tropical Africa and America, and temperate North America. Few species are generally cultivated, but many more deserve cultivation. The name was applied by the ancients to some plant of this family, probably *Órobus vérnus*.

1. *A. alopecuroìdes.*—An herbaceous perennial about 2 feet high with leaves composed of 21 to 41 ovate-lanceolate petiolulate leaflets and yellow axillary flowers. The elegant foliage of this species forms its chief attraction. A native of Spain, blooming in Midsummer.

2. *A. Monspessulànus.*—Almost stemless. Leaves hairy, of 31 to 41 leaflets. Flowers purple, on the summit of a peduncle exceeding the leaves. This is a very pretty species and the most common in gardens. A native of Europe, flowering in June or July.

3. *A. Hypoglóttis.* Milk Vetch.—An indigenous dwarf species with from 17 to 25 small hairy leaflets and purplish flowers on long axillary peduncles.

4. *A. Onobrỳchis.*—Diffuse or erect. Leaflets 8- to 12-jugate, hairy. Flowers purple, in dense spikes; peduncles longer than the leaves. One of the most beautiful species. A native of Central Europe, flowering in Summer.

Tribe VI.—*HEDÝSAREÆ.*

Habit variable. Pod transversely jointed.

23. CORONÍLLA.

Herbs or undershrubs, usually glabrous. Leaves impari-pinnate. Flowers yellow or purple or pink and white,

variegated, umbellate on long axillary peduncles, keel acute or beaked. Pod round, tetragonal or flattened, with oblong joints. About twenty species, chiefly from the Mediterranean region. The name is a diminutive of *corona*, a crown. *C. glaùca* is the common greenhouse species.

1. *C. Èmerus.* Scorpion Senna.—An erect deciduous shrub 3 to 6 feet high. Leaflets 7 to 9, obovate. Peduncles usually 2- to 3-flowered; flowers red and yellow, appearing throughout the Summer. Claws of the petals three times as long as the calyx. Europe.

2. *C. montàna* (fig. 72), syn. *C. coronàta.*—Herbaceous, about 18 inches high. Leaflets glaucous, rather fleshy, the lowest pair close to the base of the petiole. Flowers yellow, from 15 to 20 in each umbel. Claws of the petals about equalling the calyx. A native of Switzerland.



Fig. 72. Coronilla montana. (½ nat. size.)

3. *C. vària.*—A very pretty herbaceous species, growing from 1 to 3 feet high, and bearing a profusion of pink and white flowers; the keel being usually white. Leaflets about 11, oblong, obtuse. Umbels about 20-flowered. Plants are occasionally seen with the flowers wholly white or purple. Native of Europe, flowering in Summer.

4. *C. mínima.*—A dwarf diffuse suffruticose plant with minute stipules. Leaflets 7 to 9, oblong or obovate, the lowest pair near the base of the petiole. Flowers yellow, 5 to 8 in each umbel. One of the best of the hardy yellow-flowered species. South of Europe, blooming in June and July.

5. *C. Ibèrica.*—Similar to the last. Leaves composed of 7 to 9 obcordate hairy leaflets. Flowers yellow, about 5 to 8 in each umbel. A native of Spain, flowering in Summer.

24. HEDÝSARUM.

Herbs or undershrubs. Leaves imparipinnate. Flowers in axillary spikes or racemes, purple, yellow, or white. Standard obovate or obcordate, narrowed at the base. Upper stamen free. Pod flattened, prickly or naked, the joints separating when ripe. There are about fifty species, from Europe, North Africa, temperate Asia, and North America. Many of them are very handsome, but they are rarely seen in cultivation. It is a classical name.

1. *H. coronàrium.* French Honeysuckle.—This is the only common species in gardens. It attains a height of about 18 inches, and very much resembles the Sainfoin, excepting that the leaflets are larger. The flowers are scarlet or purplish, rarely white, and agreeably scented. South of Europe.

Tribe VII.—*VÍCIEÆ.*

Leaves abruptly pinnate; petiole terminated by a bristle or tendril, leaflets often toothed at the tip. Stamens generally diadelphous. Pod 2-valved.

25. LÁTHYRUS.

Climbing annuals or perennials. Leaves pinnate, petiole ending in a simple or branched tendril; stipules foliaceous. A large genus, found in temperate regions of the northern hemisphere and in South America. The name was applied by the ancients to a plant of this group.

Annual Species.

1. *L. odoràtus* (fig. 73). Sweet Pea.—This popular plant is a native of the South of Europe and Asia Minor. There is now great diversity in the colours of the different varieties, and some of the best are of quite recent acquisition. They include pure white, black, purple, scarlet, blue-edged and striped sorts. The varieties called Painted Lady, rose and white; *coccíneus supérbus*, or Invincible, fine scarlet; and *cæruleo-marginàtus*, blue-edged, are amongst the handsomest.

2. *L. Tingitànus.* Tangier Pea.—Leaves bifoliolate; leaflets ovate-oblong, mucronulate; tendrils much branched; stipules sagittate. Peduncles usually 2- or 3-flowered; flowers large, crimson or scarlet.

Perennial Species.

3. *L. Magellánicus.* Lord Anson's Pea.—A strong growing glaucous handsome herb, remarkable for the large stipules which equal the two coriaceous leaflets, and the many-flowered



Fig. 73. Lathyrus odoratus. (¼ nat. size.)



Fig. 74. Lathyrus latifolius. (⅛ nat. size.)

peduncles of purplish blue flowers. A native of the extreme South of America. It was formerly known under the name of *Armitageànus.*

4. *L. latifòlius* (fig. 74). Everlasting Pea.—This is almost as well known as the Sweet Pea. The stem here is strongly winged and the flowers several together. Our native *L. sylvéstris* is very near this, with narrower leaflets and rather smaller flowers. There is a white-flowered variety, and also a rose, besides the ordinary purplish pink one.

5. *L. grandiflòrus.*—This is near the last, having fewer larger flowers and oblong-ovate undulate leaves and tetragonal stems. Native of the South of Europe.

6. *L. tuberòsus.*—A tuberous-rooted species with unijugate leaves, leaflets oblong, tendrils slightly branched. Peduncles long, several-flowered; flowers medium-sized, rosy-pink. Europe.

26. ÒROBUS.

This differs from the last genus in having no tendril at the tip of the petiole, and is usually united with it; but for our purpose it is more convenient to keep it separate. The Latin name. Bitter Vetch is the common English appellation.

1. *O. vérnus.*—A valuable early flowering species. It grows about a foot or 18 inches high. Leaves composed of about three pairs of lanceolate acute leaflets. Flowers reddish purple, changing to pale blue. A native of Europe, flowering in April and May.

2. *O. lùteus.*—A handsome plant of about the same stature as the preceding. Leaflets about 8, elliptical, rather acute, glaucous beneath. Flowers yellow. Siberia.

3. *O. nìger.*—An indigenous mountain species, 1 to 2 feet high. Leaves of 3 to 6 pairs of oblong-lanceolate acute leaflets. Peduncles equalling or exceeding the leaves, 2- to 8-flowered; flowers livid purple, fading to blue.

4. *O. álbus.*—This is a distinct species with about 6 narrow linear-lanceolate acute leaflets. This species is very variable in the colour of its flowers, ranging from white and cream tinged with rose to purple and white and yellow. It includes *O. vàrius*, *versícolor*, and *canéscens*. A native of Austria, flowering in Spring.

Besides the above there are others equally effective, as *O. variegàtus*, rose crimson and blue striped; *O. coccíneus*, scarlet; *Jordàni*, blue; and *tuberòsus*, red fading to blue.

Tribe VIII.—*PHASÈOLEÆ.*

Twining herbs or erect shrubs or trees. Leaves pinnate or digitately trifoliolate. Stamens diadelphous, or the upper one partially united with the others. Pod 2-valved. The Scarlet Runner Bean, *Phasèolus multiflòrus*, belongs to this tribe, and being both handsome and useful may be planted with advantage in small gardens for covering arbours, etc. This genus is remarkable for the twisted keel petals.

27. ERYTHRÌNA.

Trees or shrubs, branches often thick and beset with prickles. Leaves pinnately trifoliolate. Flowers showy, usually bright scarlet, in terminal racemes. Standard petal larger and longer than the wings and keel. Calyx spathaceous, truncate, rarely almost equally 5-toothed. Pod stalked. About twenty-five species are distributed over the warmer regions. The name is from *ἐρυθρός*, red, the prevalent colour of the flowers. None of the Coral trees are hardy, but some of them will succeed in sheltered places if treated as herbaceous, and cut down each season.

1. *E. Crísta-gálli* (fig. 75).—In its native country this is arborescent, but it will throw up annual flowering stems about



Fig. 75. Erythrina Crista-galli. (¼ nat. size.)

6 or 8 feet high. The flowers are deep scarlet, and the leaves have a glaucous tinge. A native of Brazil.

E. laurifòlia is a variety of the foregoing, easily distinguished by its less robust habit, smaller bright green leaves, and brighter scarlet flowers.

Tribe IX.—*SOPHÒREÆ.*

Tall erect trees or shrubs or climbers. Leaves pinnate. Stamens 10, free.

28. CLADRÁSTIS.

Small trees with imparipinnate exstipulate leaves and terminal panicles of white flowers. Pod shortly stalked, flat, thin, scarcely dehiscent. Only two species are described: the following an American, and another from Manchuria.

1. *C. lùtea* (fig. 76), syn. *Virgília lùtea* and *tinctòria*.—Usually known under the latter name. This is a handsome deciduous



Fig. 76. Cladrastis lutea. (¼ nat. size.)

tree, bearing a great profusion of white flowers in July. There are some specimens in England upwards of thirty feet high. The wood is yellow, whence the specific name and the American appellation of Yellow Wood.

C. Amúrensis (*Máackia*) has smaller leaves and yellowish

green flowers. It is a native of the Amour district, and still rare in gardens.

29. SOPHÒRA.

Trees or shrubs, rarely herbs. Leaves imparipinnate. Flowers white, yellow, or bluish violet, in simple terminal racemes or panicles. Pods roundish or 4-winged, moniliform, fleshy or coriaceous. Natives of the warmer regions. *Sophora* is the Arabic name of a leguminous tree.

1. *S. Japónica.*—A large deciduous tree with elegant pinnated leaves composed of 9 to 11 dark green leaflets. Flowers comparatively small, dirty white. The variety *péndula* (fig. 77) is one of the handsomest of weeping trees. The figure



Fig. 77. Sophora Japonica.

here given was taken in winter, to show the habit with greater precision. A native of Japan and China.

There are two or three hardy herbaceous species, suitable only for larger collections :—*S. alopecuroìdes*, about 3 feet high, with terminal racemes of yellow flowers, from Asia Minor; *S. galegoìdes* and *S. flavéscens*, both yellow-flowered species from Siberia.

The genus *Edwárdsia* is usually incorporated with this. *E. grandiflòra* or, as it should be here termed, *Sophòra tetráptera*, is a small tree or bush from New Zealand, very variable in size, foliage and flowers, the extreme forms having been described as distinct species. The leaflets are small, and usually very numerous, and the flowers conspicuous, bright yellow, in pendulous racemes. The pod is 4-winged, and constricted between the seeds. This requires a wall and extra protection in severe weather.

Sub-Order II.—Cæsalpíneæ.

Calyx usually deeply partite. Petals imbricate, the upper one innermost. Stamens usually free.

30. GLEDÍTSCHIA.

Deciduous trees often furnished with simple or branched rigid spines. Leaves bipinnate, and on the same tree simply abruptly pinnate. Flowers polygamous, small, greenish or white, in axillary clustered racemes or fascicled cymes. Pod flattened, coriaceous or somewhat fleshy. There are four or five species, from North America and temperate and tropical Asia. So named in memory of a German botanist.

1. *G. triacánthos.* Honey Locust.—This is the species usually seen in England. It is a handsome tall-growing tree with a large spreading top. The stem and branches are usually armed with formidable trifid thorns; but the most remarkable feature is the long thin flat twisted pendent pods. In Autumn when these are numerous they give the tree a very curious appearance. The leaves are pinnate or bipinnate, and slightly hairy. A native of North America, and perfectly hardy in this country. We must not omit to mention that there is amongst others an unarmed variety, and also a pendulous one.

2. *G. monospérma*, syn. *G. inérmis.* Water Locust.—Another handsome North American tree, readily distinguished from the foregoing by its 1-seeded pod, but otherwise scarcely differing from it. It is usually a smaller tree in all its parts, with less rigid thorns.

G. Sinénsis, syn. *G. hórrida*, is an eastern species of similar habit. There are several varieties of it, including an unarmed

and a weeping one. The foliage is quite glabrous, and the pods similar to those of No. 1, but shorter and thicker.

31. GYMNÓCLADUS.

A genus comprising a single North American species, differing from *Gledítschia* in the thick turgid or terete pod. Name from *γυμνός*, unarmed, and *κλάδος*, a branch, in reference to the absence of thorns.

1. *G. Canadénsis.* Kentucky Coffee Tree.—A deciduous tree of large stature. Leaves very large, bipinnate; leaflets ovate, membranous. Flowers white, in terminal simple or thyrsoid racemes.

32. CÁSSIA.

A vast genus abounding in tropical countries, and a few species reaching the warm temperate parts of North America. Trees, shrubs, or herbs with abruptly pinnate leaves and paniculate or racemose usually yellow showy flowers. Sepals imbricate. Petals 5. Stamens 5 to 10, unequal, some of them abortive. An old Greek name.

1. *C. Marilándica.*—An herbaceous glabrous perennial, 3 to 4 feet high. Leaflets 10 to 20, lanceolate-oblong, obtuse. Flowers in axillary racemes, yellow. A native of North America, where it is called Wild Senna.

There are some of the annual species which might be grown in the open air. *C. níctitans* and *C. procúmbens* are hardy North American annuals.

33. CÉRCIS.

Small deciduous trees, easily distinguished from all other hardy trees of this class by their simple reniform or cordate leaves. Flowers somewhat papilionaceous, but the upper petal interior, usually purple or rose, rarely white, produced in fascicles along the branches. Pod oblong or broadly linear, flat, with a narrow wing along the upper suture. The ancient Grecian name.

1. *C. Siliquástrum* (fig. 78). Judas Tree.—A small tree of remarkably ungainly irregular growth, but of handsome foliage and flowers. Leaves glabrous, entire, reniform, rounded at the apex. Flowers rosy-purple, produced in Spring before the leaves have attained their full development. There is a white-flowered variety, but it appears to be very rare. A native of Western Asia.

2. *C. Canadénsis.*—Similar to the foregoing, but smaller and of more slender habit, with cordate acuminate leaves and fewer paler flowers. North America.



Fig. 78. Cercis Siliquastrum. (⅓ nat. size.)

3. *C. Chinénsis*, syn. *C. Japónica.*—This is of quite recent introduction, and a very handsome species. In foliage it closely resembles *Canadénsis*. The rosy-pink flowers are larger, however, and very numerous, and produced on the old wood in Spring before the appearance of the leaves.

Order XXXVIII.—ROSÀCEÆ.

Herbs, shrubs, or trees, erect, prostrate, or rarely climbing. Leaves alternate or rarely opposite, simple or variously compound, stipulate. Calyx superior or inferior, with 5 or 4 lobes, the fifth lobe next the axis. Petals 5, rarely none, inserted under the margin of the disk, imbricate. Stamens usually numerous, seldom 1 or few, inserted with the petals. Disk lining the calyx-tube. Fruit various. Seeds ascending or pendulous, exalbuminous. With the tribe *Chrysobálaneæ*, this

order numbers 71 genera and about 1,000 species, occurring in all parts of the globe. This is one of the most important groups of plants, furnishing numerous useful species, such as the Apple, Pear, Plum, Cherry, Strawberry, and Raspberry, besides many of the most ornamental shrubs and herbaceous plants of our gardens.

Tribe I.—*PRÙNEÆ.*

Calyx usually deciduous: lobes ebracteate. Stamens many. Carpel 1; style terminal; ovules 2, pendulous. Fruit drupaceous, not included within the calyx-tube. Trees or shrubs.

1. PRÙNUS.

(Including *Amýgdalus*, *Armenìaca*, *Pérsica*, and *Cérasus.*)



Fig. 79. Prunus Persica flore pleno. (¼ nat. size.)

Evergreen or deciduous trees or shrubs. Leaves simple, alternate, often serrulate. Flowers solitary, racemose, or in fascicled corymbs, white or rose. The number of the species is estimated at about eighty, chiefly inhabiting the temperate zone of the northern hemisphere, fewer in tropical America and Asia. *Prùnus* is the Latin name of the Plum-tree.

There are several species belonging to this genus, of which the names will be sufficient, such as *P. spinòsa*, Sloe or Blackthorn, with its varieties from which the Plums and Bullace of our gardens are believed to have sprung; *P. Cérasus*, Cherry, of which there is an interesting double-flowered variety; *P. Pérsica*, the Peach, also furnishes several handsome varieties with double flowers (fig. 79); *P. làvis*, Nectarine; *P. Armenìaca*, Apricot; *P. Sinénsis flòre álbo plèno*, and *fl. ròseo plèno*, require no further description; and *P. trilòba* (*Amygdalópsis*) is a very handsome early flowering shrub with more or less 3-lobed leaves and white or rose large double flowers appearing before the leaves. Besides the above there are some other useful species, such as *P. Virginiàna*; and also other varieties of the Peach, Almond, and some Japanese and Chinese allied species, will be found in the catalogues

published by our nurserymen, including weeping varieties of the Almond, Peach, and Bird Cherry, and a variegated variety of *P. Mahàleb*, a species with fragrant flowers, extensively employed as a stock for grafting cherries upon. A few of the more ornamental species cultivated in gardens we will arrange according to their affinities.

Evergreen Species.

1. *P. Laurocérasus.* Cherry Laurel or Common Laurel.—The common form is too well known to need description here, but there are some of the varieties, notably the Caucasian Laurel, *P. L. Caucásica*, superior to it not only in appearance, but also in hardiness. This variety has very rich dark green glossy foliage, the broadest part of the leaf being above the middle. It is, moreover, a vigorous grower, and when better known will doubtless supersede all others for general purposes. The Versailles Laurel, *P. L. latifòlia*, differs from the ordinary form in having larger leaves. The Colchican Laurel, *P. L. Cólchica*, is also of a hardy type, and quite distinct in habit and foliage. It is a dwarf spreading bush with narrow sharply serrated pale green leaves. Besides the above there is a variety called *rotundifòlia*, of recent introduction, with short broad leaves; another, termed the Grecian, with very narrow leaves; and a third with very small leaves known as the Alexandrian: none of these, however, are desirable in small gardens. The variety with variegated leaves scarcely deserves notice.

2. *P. Lusitánica.* Portugal Laurel.—This is perhaps the most valuable of all our hardy evergreens. There is a variety, *myrtifòlia*, of compact habit with smaller narrow leaves, worthy of a place where the ordinary form would be too large. There is also a variegated variety of no particular merit. The variety *Azórica* is of recent introduction, and probably not so hardy as the Continental form.

Deciduous Species.

3. *P. Pàdus.* Bird Cherry.—A handsome small tree, occurring wild in several parts of Britain. Leaves oblong or obovate, doubly serrate, unequally cordate at the base. Flowers white, in terminal or axillary racemes, appearing in May.

4. *P. commùnis* (fig. 80). Almond.—This tree very much resembles the Peach-tree, but it is larger, of more erect habit, has larger flowers, and the fruit is not fleshy, the stone being enveloped in a tough downy fibrous husk. The varieties are numerous, and include pink, deep red, and double-flowered, and another of weeping habit. A native of North Africa, and a very ornamental tree in early Spring when covered with flowers.



Fig. 80. Prunus communis. (⅛ nat. size.)

P. nàna and *P. pùmila*, syn. *Cérasus Japónica*, are allied dwarf shrubby species, the former with single, the latter with double red or white flowers, and leaves bordered with red.

Tribe II.—*SPIRÆEÆ.*

Lobes of the calyx usually persistent. Stamens 10 or more. Carpels 1 to 8. Ovules 2 or more, pendulous. Carpels not included in the calyx-tube. Shrubs or herbs.

2. SPIRÆA.

Shrubby or herbaceous plants with alternate simple pinnate or bi- or tri-ternate leaves, and free or sheathing stipules. Flowers rose or white, inflorescence variable. Sepals and petals 4 or 5. Stamens 20 to 60, inserted around the mouth of the calyx-tube. Carpels usually 5, dehiscent; seeds many, rarely few, oblong or narrow. The name is said to be derived from σπειράω, to wind, in allusion to the suitability of some species for forming garlands. Somewhere about fifty species occur in the temperate and cold regions of the North, a few reaching the mountains of the tropics. This name was applied to a plant by Theophrastus, supposed to be *S. salicifòlia*. The species cultivated are numerous, but we must confine our enumeration to a selection of the best. The plant often named *S. Japónica*, or *S. barbàta*, will be found under its proper genus *Astílbe*.

Herbaceous Species.

1. *S. Ulmària.* Meadow Sweet.—This attains a height of 3 or 4 feet in moist places. Leaves 1 to 2 feet long, interruptedly pinnate, serrate, clothed with a white tomentum beneath. Flowers white, very fragrant, in large terminal cymes. Carpels twisted, glabrous. This is one of our handsomest native plants, of which there is a double-flowered



Fig. 81. Spiræa Aruncus. ($\frac{1}{8}$ nat. size.)

variety worthy of cultivation in a large garden. It flowers in Summer.

2. *S. Filipéndula.* Dropwort. — A tuberous-rooted plant

1 to 2 feet high. Leaves interruptedly pinnate, glabrous. Flowers cymose, white tinged with pink. Carpels straight, pubescent. The double variety of this is one of the best of the genus for a border. June and July.

3. *S. Arúncus* (fig. 81). Goat's Beard.—A tall vigorous plant about 4 feet high, with large tripinnate radical leaves and yellowish white diœcious flowers. A native of Central Europe and Siberia, flowering in Summer.

4. *S. lobàta.* Queen of the Prairies.—In habit this closely resembles the Meadow Sweet. The large leaves are interruptedly pinnate with nearly glabrous palmately-divided leaflets, the terminal one largest. Flowers in large terminal corymbs, bright rosy-red. North America.

5. *S. palmàta.*—A very beautiful species of recent introduction. An erect glabrous plant with palmately-lobed toothed leaves and large corymbose panicles of brilliant crimson flowers. The stems and leaf-stalks are of the same colour as the flowers, and altogether it forms one of the most striking and effective species in cultivation. A native of Japan.

Shrubby Species.

6. *S. bélla.*—A pretty species about 3 feet high, with simple ovate acute serrate glabrous leaves and terminal spreading cymes of rosy-red flowers. A native of Nepal, flowering in July.

7. *S. Fortùnei*, syn. *S. callòsa* of gardens.—From 4 to 6 feet high, with terminal flat corymbs of rosy-red flowers. Leaves glabrescent, simple, lanceolate, acute, sharply serrate, serratures thickened at the tip. A very handsome and desirable Chinese species.

8. *S. grandiflòra*, syn. *Exochórda grandiflòra.*—A glabrous shrub with oblong-lanceolate membranous petiolate leaves and large white flowers in axillary slender few-flowered racemes. This handsome species has much larger flowers than the others, the calyx is furnished with two bracts at its base, and the carpels are connate. It comes from the North of China, and flowers in May.

9. *S. prunifòlia.*—The variety *flore pleno* is one of the most familiar in gardens. It is a dwarf shrub with small glabrous lanceolate leaves connate at the base and irregularly serrated on the upper half, and pure white flowers produced in fascicles

the whole length of the branches. A Japanese species, flowering in Spring.

10. *S. Reevesiàna*, syn. *S. corymbòsa*, *S. lanceolàta*, and *S. Cantoniénsis*.—A glabrous shrub 3 or 4 feet high, with small simple lanceolate trilobate and deeply-toothed leaves. Flowers in terminal umbels, white and showy, appearing in early Summer. There is also a good double-flowered variety. Japan. *S. chamædrifòlia* is an allied Japanese species with smaller flowers and crenately-lobed leaves.

11. *S. Lindleyàna*.—A tall branching shrub with large unequally pinnate leaves and large terminal panicles of white flowers. Leaflets 11 to 21, sessile, ovate-lanceolate, coarsely serrated, glaucous beneath. A native of the Himalayas, flowering towards the end of September. *S. sorbifòlia* is a closely-allied species or variety from India.

12. *S. Douglásii*.—An erect handsome shrub with simple oblong-lanceolate obtuse leaves, serrulate towards the apex, and clothed with a white down beneath. Flowers nearly sessile, in a dense terminal thyrsoid panicle from 6 to 9 inches in length. A native of North-western America.

13. *S. Nobleàna*.—Near the last in habit and foliage, with a looser inflorescence. Leaves elliptical or oblong, obtuse or acute, more or less toothed, pubescent or nearly glabrous below. Flowers purplish red. Also from North-western America, and possibly a variety of the last. *S. Menzièsii* and *S. salicifòlia* are both very near the foregoing, and perhaps, botanically speaking, forms of one species, though they are distinct enough in the cultivated plants.



Fig. 82. Kerria Japonica. (¼ nat. size.)

3. KÉRRIA.

An old favourite for training against walls, formerly known as *Córchorus*, is the only plant belonging to this genus. Petals 5. Stamens numerous. Carpels 5 to 8, dry and

indehiscent, 1-seeded. Named in honour of Mr. Ker, editor of the early volumes of the 'Botanical Magazine.'

1. *K. Japónica* (fig. 82).—A small shrub with slender dark green branches and orange-yellow solitary terminal flowers. The double variety is the only one in general cultivation.

4. RHODÓTYPOS.

Another monotypic Japanese genus. A deciduous shrub with opposite branches and leaves, and rather large white flowers. Calyx-lobes 4, large, foliaceous, deeply serrated. Petals 4. Stamens many. Carpels 1 to 4, drupoid, brown, shining, 1-seeded, putamen bony. Name from ῥόδον, a rose, and τύπος, a type.

1. *R. Kerrioìdes.*—Leaves ovate or oblong-lanceolate, acute, deeply serrated, silky beneath. Flowers solitary, terminal.

Tribe III.—*RÙBEÆ.*

Calyx-lobes persistent, ebracteolate. Stamens and carpels numerous; ovules 2, collateral, pendulous.

5. RÙBUS.

Creeping herbs or sarmentose often prickly shrubs. Leaves distant, alternate, simple, lobed, or 3- to 5-foliolate, or imparipinnate. This genus is remarkable for the fleshy drupes usually aggregated on a conical receptacle, and 1-seeded by abortion. The species are very numerous, and especially abundant in the northern hemisphere. A few are ornamental or curious. The old Latin name.

1. *R. fruticòsus.* Bramble.—Some of the varieties are very pretty, as the double white, double rose, and cut-leaved.

2. *R. biflòrus.*—This species is remarkable for its tall pure white spiny stems and is often seen under the name *leucodérmis*, but that name belongs to a totally distinct plant. Leaves simple, trilobate or ternate, glabrescent above, white and tomentose beneath. Flowers white, very abundant and showy. Fruit about the size of the Blackberry, deep orange or orange-red. Nepal.

3. *R. odoràtus.*—Stem erect, unarmed, clothed with purplish hispid glandular hairs. Leaves large, simple, 3- or 5-lobed; lobes toothed, the central one largest, pubescent be-

neath. Flowers very large, purplish rose. Fruit orange-red. This is a very showy plant, from North America.

4. *R. spectábilis.*—An unarmed or spiny shrub about 6 feet high. Leaves dense, ternate or trilobate; leaflets or lobes serrulate. Flowers bright red, axillary, solitary, on long pendulous peduncles. Fruit orange-red. Native of North-western America.

5. *R. árcticus.*—This is an interesting little species about 6 inches high, with trifoliolate leaves and deep red flowers. Arctic regions.

Tribe IV.—*POTENTÍLLEÆ.*

Calyx persistent, bracteolate. Carpels usually numerous, with one ascending seed in each.

6. GÉUM.

Perennial herbs with tufted pinnate radical leaves, the terminal lobe very large. These plants differ from the Potentillas in their pinnate leaves and elongated styles after flowering. About thirty species, from temperate regions of both hemispheres. Name from γεύω, to stimulate, from the aromatic roots.

1. *G. Chiloénse*, syn. *G. coccíneum* of Lindley.—An erect branching herb about 2 feet high. Flowers in terminal leafy branched loose panicles about 1½ inch in diameter. There are two varieties, one with bright scarlet, and the other with dark crimson flowers; both of them very pretty where there is plenty of space. Native of Chiloe.

7. POTENTÍLLA.

Herbs or rarely shrubs, those in general cultivation with digitate leaves. Stipules adnate to the petiole. Flowers showy, white, yellow, crimson, or scarlet. Calyx with 5 or 4 bracteoles, and as many sepals, valvate in bud. Petals of the same number. Stamens many. Styles not elongating after flowering. About 120 species, nearly all within the north temperate zone, a few on the mountains of the tropics, and two in the south. So named from *potens*, powerful, effective, from their reputed medicinal properties.

1. *P. atrosanguínea.*—A hairy branching herbaceous plant about 2 feet high with petiolate digitately trifoliolate leaves;

leaflets obovate, serrate, with a silvery tomentum beneath. Flowers 1½ to 2 inches in diameter, dark crimson. A native of Nepal, blossoming from May to July.

2. *P. Nepalénsis* of Hooker, not of Don (*P. formòsa* of Don).—Very much like the foregoing, but with quinate radical leaves. There are several handsome varieties of these two species in cultivation, either of hybrid origin or from natural variation. *Russelliàna*, *insígnis*, *Menzièsii*, *striàta*, and many others; some with double yellow and crimson flowers.

There are many yellow and white flowered species. *P. splèndens*, with silvery foliage, and *P. Pyrenàica*, with yellow flowers; and *P. rupéstris* and *P. álba*, with white flowers, are amongst the best. *P. fruticòsa* is an indigenous shrub 2 to 4 feet high with 3- to 5-foliolate leaves and yellow flowers.

Tribe V.—*POTÈRIEÆ.*

Petals often absent. Carpels 1 to 3, included within calyx-tube.

This tribe furnishes few ornamental species. The elegant plaited foliage of the Lady's Mantle (*Alchemílla*) entitles it to a place in the mixed border; and some of the Burnets (*Sanguisórba*) have pretty pinnate foliage and dense spicate white, pink, or red flowers.

Tribe VI.—*ROSEÆ.*

This tribe includes only one genus, as characterised below.

8. RÒSA.

This favourite genus is distinguished as follows: Calyx 5-lobed; lobes simple or compound, inserted upon the top of a spherical or pear-shaped calycinal tube, generally considered as a mere dilatation of the flower-stalk; corolla normally of 5 petals alternating with the calyx-lobes, but very susceptible of duplification through the transformation of some or all of the stamens into petals; stamens indefinite in number, often exceeding a hundred, inserted around the circumference of the receptacle, within the petals; carpels more or less numerous, according to the species (5 to 60), uniovulate, inserted at the base and upon the walls of the calycinal tube, each with a

simple style and stigma projecting beyond the mouth of the tube. The ripe fruit of the Rose, consisting of many 1-seeded carpels within a more or less fleshy tube, is analogous in organic structure to the inferior fruit of the *Pomàceæ*.

Roses are woody erect or more or less climbing or trailing thorny shrubs, generally spreading by suckers from the roots, with compound stipulate leaves, excepting one species, *R. berberidifòlia*, which has simple or reduced leaves, and is considered by some botanists as forming the type of a distinct genus. The leaves of the majority of the species are deciduous; but some retain their foliage so far into the winter as to entitle them to be classed with evergreen shrubs.

The flowers of Roses present us with an endless variety of tints, ranging from pure white to dark purple, though no variety or species is known with scarlet flowers, and there is not the slightest approach to blue, nor is it likely that cultivators will ever succeed in producing a variety of that colour. By way of compensation, however, we have many bright yellow species, from which, by variation and skilful crossing with other colours, some of the most delicate salmon, flesh, cream, and other shades have been obtained. Another, though rare, variation in the colouring of Roses is seen in some striped sorts, where white and carmine or lilac are combined; but hitherto the yellow ones have not shown this peculiarity.

A very important quality possessed by most if not all species of Roses under cultivation is to become more or less double by the transformation of the stamens into petals. This tendency seldom exhibits itself when the plant is in its wild state, but nothing is more frequent when the plant is transferred to a richer soil. In most instances the transformation of the stamens is only partial, but occasionally total, causing the flowers to become barren, unless fecundated by foreign pollen, for the disappearance of stamens does not necessarily involve the absence of ovaries. According to the degree of this transformation Roses are termed semi-double, double, or very double or full. And the fuller or more double a rose is, the greater is its value from a horticultural point of view, though in reality it is a monstrosity.

At the present time upwards of thirty botanical species are known, all belonging to the northern hemisphere—from Kamtschatka and Japan to the western shores of Europe, and in smaller numbers from North America. No species is known

south of the equator, in fact few pass the 25th degree of North latitude. The actual southern limits of the genus are in the Indian peninsula, Abyssinia, and Mexico. All are hardy in the South of Europe, and the tenderest require but slight protection even in England. The specific forms, or those forms considered as such, in this very homogeneous and distinct genus are, on the contrary, so closely allied and so variable in themselves that their determination has ever been the Gordian knot of botanists. In spite of the greatest efforts and researches, the limits of specific groups and the characters upon which they should rest are still matters of discussion. Hence follow great confusion and uncertainty with regard to the number and distribution of the species. But this confusion is as nothing compared with that caused by horticulturists, whose innumerable crossings and re-crossings of species and varieties have resulted in the almost total obliteration of the original forms, so that it is now utterly impossible in this chaos of varieties to recognise their specific types. A glance at the catalogues of our principal Rose growers is sufficient to discover that the groups into which they divide their species and varieties are for the greater part purely arbitrary aggregations.

In no other genus are there so many hybrids as in this. Every year our nurserymen offer new sorts, and at the present time one might easily enumerate a thousand varieties said to be of hybrid origin, of which, however, we have in few cases positive proof.

As we have previously remarked, the greatest uncertainty still exists respecting the limits of the botanical species of this genus. What is considered by one monographer as a good species is reduced to a simple variety by another. In the following enumeration, therefore, we can only set forth opinions, but with due care to range ourselves with those which appear most probable. For our guide we believe we cannot do better than take Lindley's monograph, which appeared upwards of fifty years ago, but subsequent publications have added very little to it.

Dr. Lindley divided Roses into eleven tolerably natural tribes, though in some cases the differences are very slight. They are as follow:—

I. Rosæ Ferôces, or Spiny Roses.—Bushes from 3 to 6 feet high, branches densely armed with prickles; leaves deciduous,

fruits downy when young, but becoming glabrous towards maturity. This group contains only two species, *R. ferox* and *R. Kamtchática*. The former, a native of the Caucasus, has tomentose branches so densely bristling with sharp thorns that it has acquired the name of Hedgehog Rose. The leaves consist of 5 to 9 dentate leaflets, glabrous above; the flowers are large and solitary, of a beautiful rosy purple, appearing early, but only slightly scented. No double variety of this species has hitherto been reported.

The Kamtschatka Rose, *R. Kamtschática*, is confined to the eastern extremity of Asia, and differs but slightly from the preceding, being almost equally spiny, but with the peculiarity that the spines are deciduous. The solitary flowers are of a deep red colour. No double variety is known of this species. These two species are well adapted for planting in masses in shrubberies, and also for hedges.

II. Rosæ Bracteàtæ, or Bracteate Roses.—Dense bushes from 3 to 6 feet high, readily distinguished from all other Roses by their floral leaves or bracts, and their shaggy ovaries and fruits. Only two species are known, both from Central and Eastern Asia, and differing so slightly that they may easily be confounded one with the other.

R. palústris, the Marsh Rose of Nepal and China, has white solitary flowers supported by a bracteiform involucre of three or four leaves.

R. bracteàta, Macartney Rose, a charming little bush, from India and Southern China, with roundish-obovate persistent shining leaves and solitary white flowers, surrounded by 8–10 pectinate silky bracts. The beautiful semi-double pure white Macartney Rose is said to have originated from seed of this species. Two other old but commendable varieties are likewise referred to this species, namely: *álba odoràta*, with large full white flowers yellowish in the centre; and *Maria Leonida*, a climbing variety with white flowers, which probably belongs to another species.

The Small-leaved Rose, *R. microphýlla*, which resembles the Macartney in more than one respect, naturally finds its place here. It is a small compact bush of a beautiful verdure with slender flexible branches armed with spines near the insertion of the petioles. The leaves consist of 5–9 very small oval or roundish perfectly glabrous and shining finely toothed leaf-

lets. The flowers are solitary, very double, rose or pale carmine. The calyx is densely covered all over with fine thorns, a character wanting in the other species of the group, and perhaps sufficient to separate this from it as a distinct tribe. This pretty Rose is indigenous in China and the mountains of Northern India, whence it was brought to England towards the end of the last century. Two or three varieties not uncommon in gardens are referred to this species: the *Old Purple*, a very double deep carmine Rose; and *Triomphe de Macheteaux*, a very double white variety tinged with rose. Another species attached to this group is the *Rosa clinophýlla*, from which, hybridised with *R. berberidifòlia*, came Hardy's Rose, a variety with yellow flowers spotted with purple at the base of the petals, but this has become very rare now.

The Roses of this group require slight protection in severe weather, and are well suited for covering dwarf walls.

III. Ròsæ Cinnamòmeæ, or Cinnamon Roses.—Shrubs or bushes variable in height, natives of Europe, Western Asia, and North America. The leaflets are usually long and lanceolate, especially in the American species; the flowers are of medium size, rosy carmine, and generally produced in clusters, though rarely solitary. The almost spherical fruits ordinarily lose the calyx-leaves on arriving at maturity.

R. cinnamòmea, Cinnamon Rose, a European shrub, chiefly inhabiting the mountainous regions of the South, where it attains a height of 9 or 10 feet or more, with a stem occasionally thicker than the arm. The almost straight spines occur in pairs a little below the insertion of the petioles; the leaves are mostly composed of 5 oblong leaflets of a greyish green above and glaucous beneath; and the lilac or very pale carmine flowers are either solitary or two or three together on the same peduncle. This Rose, which has been in cultivation a long time, has given birth to several varieties, single and double, amongst which we may notice the *Rose du Saint-Sacrement*, still to be seen in some gardens.

R. maiàlis, May Rose, is a small bush about 3 feet high, from the North of Europe, with weak spines scattered or united in pairs on a level with the insertion of the petioles. The leaves have usually 7 leaflets, ovate or obovate, and slightly glaucous. Flowers small, solitary, pale rose; fruit spherical, orange-coloured, not losing the calyx-leaves on arriving at

maturity. This species, formerly more extensively cultivated than now, has given rise to few varieties, which are for the greater part forgotten.

R. ràpa, the Turnip Rose—a bush about 4 or 5 feet high, and almost entirely destitute of spines—comes from North America. Leaves of 5 to 9 oblong shining leaflets, assuming a reddish tinge in Autumn. Flowers in clusters, of a bright red, sometimes white, often double even in the wild state. This beautiful Rose, rather rare in France, is frequently cultivated in England, where it is advantageously employed in masses in landscape gardens. The name Turnip Rose probably originated from the resemblance of the spherical fruit surmounted by the leafy calyx-lobes to a turnip.

R. Caroliniàna, the Carolina Rose, is also a native of North America, inhabiting marshy ground. A shrub 5 to 10 feet high, remarkable for the length of its stipules and the form of its leaflets, which are oval, acute, dentate, of a deep green above. Flowers in clusters, large, rosy carmine. This, like the foregoing, is common in English collections, and is equally effective in clumps.

IV. Rosæ Pimpinellifòliæ, or Burnet Roses.—Shrubs with or without spines, whose fruits retain the convergent calyx-leaves until maturity. This tribe is more easily distinguished from the others by the number of the leaflets (from 7 to 15) than by all the other characters. The varieties called Scotch Roses of our gardens belong to this tribe. The species most worthy of notice are:—

R. pimpinellifòlia, syn. *R. spinosíssima*, the Burnet or Scotch Rose, so named from its small rounded leaflets, recalling those of the common Burnet. It is a native shrub, usually forming dense bushes 2 to 3 feet high, with about 7 orbicular dentate leaflets to each leaf. The flowers are small and solitary, quite white or shading off to yellow around the centre. This charming little Rose has produced several double varieties, amongst which we may mention the *Double White*, *Double Yellow*, *Estelle*, with rose-coloured flowers, and *Stanwells*, with delicate rose-coloured flowers, said to be perpetual flowering.

There is a very small-flowered form in the South of France, considered a distinct species by De Candolle and Lindley, under the name of *R. myriacántha*, besides many other forms found in this country, which have received specific names.

R. sulphùrea, Sulphur-coloured Rose.—A bush 3 to 6 feet high; leaves with 7 glaucescent leaflets; stem armed with unequal spines intermingled with bristles. The flowers are large and very double, of the most beautiful yellow; but they do not open well, which may perhaps be attributed to unfavourable conditions of cultivation. The celebrated Banks affirms having seen it flower in the most perfect manner upon swampy ground. Linnæus confounded this species with the Eglantine, *R. lùtea*, which is now known to be an entirely distinct species. It is not known whence it comes, but we have reason for believing it to be a native of Western Asia. Its principal varieties are the *Old Yellow* with large very full flowers of a bright yellow, and the *Yellow Pompon* which differs only in its smaller dimensions.

R. alpìna, the Alpine Rose, is found on all the principal mountain chains of Europe, and grows from 5–10 feet high. The stems are erect, almost spineless, or sparsely furnished with spines, often of a purple-brown colour. Leaves with 7 to 9 oval or elliptical acute dentate leaflets. Flowers solitary, of a reddish carmine; fruits orange-red when ripe. This species, like most of the others, is extremely variable according to localities, and consequently its synonomy is very complicated. Cultivated for a long time in our gardens, it has produced a great many varieties, doubtless through intercrossing with other species, of which the Boursaults are the most important. These are supposed to have been the result of a cross between this species and the Tea Rose of China. *Amadis* is one of the best of this class, being very hardy, a profuse bloomer, and almost destitute of thorns, with a climbing habit. The flowers are large, semi-double, and of a deep purple colour. No class of Roses is better suited than this for covering trellis-work or dwelling-houses.

V. Ròsæ Centifòliæ, the Provence or Cabbage and Moss Roses, form the most interesting group in the genus, and contain those races longest in cultivation. Here also, and perhaps more than elsewhere, we find great divergence of opinions among botanists as to the number of species and the characters they should rest upon. For our own part we are inclined to look upon the whole group as one species, which, either by natural variation or hybridisation with other species, has given birth to all these secondary forms. We shall pass in review the principal varieties.

R. centifòlia, Hundred-leaved Rose, is the true classical species, one of the most beautiful, the most deliciously scented, the one sung by the poets of all epochs, and the one which held the first rank in our gardens until the arrival of the Perpetual species from China and India, which without sufficient reason have banished it to the second or third place. The attar of Roses of commerce is furnished to a great extent by the varieties of this species. Even in France it is cultivated on a considerable scale for the needs of perfumery.

It is a bush 3 to 6 feet in height, having its stems armed with unequal spines interspersed with bristles and glandular hairs. The leaves consist of five large broadly ovate doubly toothed leaflets with glandular hairs on the margins. The flowers are large and more or less double according to the varieties, solitary or two or three together on the same peduncle, drooping, rose or rosy carmine, with the calyx-tube clothed with glandular viscose odoriferous hairs. The fruit is ovoid-oblong, but never much elongated, of an orange or reddish colour when ripe.

It is not known with certainty whether this species is a native of Southern Europe, although it is found naturalised in many places; but it is probable that it was originally brought from the East at a very remote period.

The Hundred-leaved Rose has varied in all directions through the influence of climates, soils, culture, and above all, we believe, by crossing; but there are three particularly remarkable variations—one affecting the size, another the colour, and a third the hairy clothing of the calyx-tube. To the first modification belong the *Miniature Provence* or *Pompon Roses*, exceedingly dwarf bushes, whose flowers, without ceasing to be double, are veritable miniatures. To the second belong those in which the normal rosy carmine is replaced by a more or less pure white; and to the third belong the *Moss Roses*, already numerous in varieties, which are distinguished by the curious transformation of the hairs of the calyx-tube, and sometimes also those of the peduncles and petioles, into a green wad very similar to moss. This class of Roses is very much prized in England, where, it appears, the first Moss Roses raised from seed were observed.

Nursery catalogues contain the names of several hundreds of varieties of the Centifolia class, either with or without the qualification of hybrid. We have already said that the arbi-

trary classifications adopted by horticulturists have no scientific value, and we might add that in a gardening point of view they are of very slender utility. The catalogues are filled with names of varieties, many of which it is utterly impossible to distinguish. It would be a great service to amateurs if these catalogues were scrupulously purged, and thenceforward none but varieties of real merit admitted. In this way many of the older varieties, almost abandoned at the present time, would reassert their claims to be placed in the first rank, and this fact induces us to enumerate a few here which already date back many years.

Amongst the common Centifolias or Provence Roses we have the *Painters' Rose* (fig. 83), very large, very double and rose-coloured; the common *Cabbage Rose*, very large, double, rosy-pink; the *Celery-leaved Rose*, medium size, full, and rose-



Fig. 83. Painters' Rose. (¼ nat. size.)



Fig. 84. Dwarf Pompon. (½ nat. size.)

coloured; *Triomphe d'Abbeville*, very large, double, bright rose; *Vilmorin*, large, full, flesh-coloured; *Kingston*, very small, full, rose; *Unique blanche*, medium size, full, and white.

Miniature Provence or Pompon Roses:—*Saint François* or *Dwarf Pompon* (fig. 84), very small, full, and rose-coloured; the *White Pompon* or *Pompon blanc*, very small, full and

white. Moss Roses exhibit all shades of colour from pure white to deep crimson: *Sage-leaved Moss Rose*, medium, double, rose; *Shining-leaved Moss Rose*, medium, full, delicate rose; *Blanche* or *White*, medium, double, white; *Carnée*, large, full, flesh-coloured; *cristata* (fig. 85), large, full, rose, with the calyx-lobes mossy; *Mousseuse de Metz*, medium, full, deep rose; *Mousseuse d'Orléans*, medium, full, bright purple; *Panachée double*, medium, full, white or flesh, often striped; *Perpétuelle Mauget*, medium, full, rose, very delicate; *Zoé* (fig. 86), medium, full, rose, very mossy. There are besides some Moss Roses with a longer flowering season, and thus called



Fig. 85. Crested Moss Rose. (¼ nat. size.)



Fig. 86. Moss Rose, Zoé. (¼ nat. size.)

perpetual. *Madame Ory* and *Salét* are referred to this category.

R. Gallica, the French or Provins Rose, and *R. Provinciàlis* (of some authors), the Provence Rose, are merely races of *R. centifòlia*, from which they are with difficulty distinguished. Indeed, it seems probable that they are derived from crosses between this species and another, the differences being too slender to warrant any other assumption. The Provins Rose differs but slightly from the typical Centifolia, and chiefly in having larger clusters of flowers, which are erect instead of drooping. An immense number of varieties of all shades, from

white to deep carmine, belong here, and are often confounded with those of the common Centifolia or Provence. We may mention the Rose *de Champagne* or *de Meaux*, which is a dwarf variety, and *Tricolore de Flandre*, which is supposed to be a hybrid between the Provins and some other species. This rose is of medium size, very double, admirably streaked with bright carmine on a white ground. It is perhaps the most beautiful of striped Roses.

R. Damascèna, Damask or Monthly Rose, may be nothing more than a tolerably distinct race of *R. centifòlia*, so much does it resemble this species in all its essential characteristics. It is distinguished from it, however, by its longer spines, oblong fruits, flowers in corymbs, and the recurved calyx-leaves at the time of flowering—in the latter character approaching *R. álba*. The origin of this species is equally obscure with that of the preceding; but according to tradition it comes from Syria, and particularly from the neighbourhood of Damascus, whence it was brought by a certain Comte de Brie on his return from the Crusade. Some authors, among others Lindley and Loiseleur-Deslongschamps, unite *R. Bélgica*, the Belgian Rose, which differs in its smaller stature and larger clusters of flowers, and *R. bifèra*, remarkable for the long duration of its flowering season, with *R. Damascèna*, as simple varieties.

Horticultural catalogues mention numerous varieties of the Damask Rose, with rose, white or striped flowers. Many of these varieties are indubitably hybrids, and not always recognisable from those issuing from *R. Portlándica*, which itself may be of hybrid origin. We may cite the following as being some of the best:—*Leda* or *Painted*, blush, edged with lake; *La Ville de Bruxelles*, very large and double, of a rosy salmon colour; *Madame Soëtmans*, creamy white, large and full; *Madame Hardy*, the most beautiful of the White Roses of this group; and lastly, according to some Rose growers, *Gloire des Rosomanes*, discovered by M. Vibert, of Angers, amongst his seedlings, and by some without further proof referred to the Tea Rose; but William Paul makes a subordinate group of this and the varieties it has given rise to in the Hybrid Perpetual class.

R. Portlàndica, the Portland Rose, so named in honour of the Duchess of Portland, a great admirer of Roses, who had

herself a celebrated rosary towards the end of the last century. It is one of the best varieties England has produced. According to Andrews it approaches both *R. Gállica* and *R. Damascèna*, having the foliage of the former and the fruit of the latter. The flowers are almost invariably solitary, large, semi-double, and of the most beautiful bright carmine. The wood is of a paler green, with numerous fine thorns, and the foliage of a lighter green than in most other Roses. But what distinguishes it still better is the long continued succession of flowers, which are produced from early Summer till late in the Autumn; and hence it has become the parent of a multiplicity of new varieties possessing the same advantage of a protracted flowering season. These are known as Hybrid Perpetual or Portland Hybrid varieties. It is almost beyond a doubt that a great number of these are due to fresh crosses, not only between the primitive types, the Damask and Provins, but also with other species, thus offering such a confused mixture of characters as to render satisfactory classification impossible. It is supposed that the beautiful bright crimson Rose *du Roi* is a descendant of the Portland Rose, the merit of discovering which is attributed to M. Souchet, formerly gardener at the Palace of Fontainebleau. Few Roses enjoy such wide-spread popularity, and are cultivated on so large a scale as this is in Paris and its environs.[1]

VI. Rósæ Villósæ, Downy Roses.—This not very natural and ill-defined tribe is distinguished by the following characteristics: Stems erect, inflexible; spines almost straight; leaflets oval or oblong, with diverging teeth; calyx-leaves persistent on the fruit and connivent; disk fleshy, closing the entrance to the calyx-tube. Its affinity is on the one hand with the Sweet Briars, and on the other with the Dog Roses.

The most important species of this group is *R. álba*, the White Rose, which for the beauty of its flowers equals perhaps *R. centifólia* itself. This is a European bushy shrub from 5 to 10 feet high, with remarkably glaucous foliage composed of 5–7 leaflets shortly oval or almost round. The flowers are large and abundant, solitary or in corymbs, showing according to the varieties every shade between white and bright rose. The fruit is oblong, and scarlet when ripe.

[1] Recent investigations have led to these Roses being united as one species under the name of *R. Gállica*.

This species, which has been in cultivation for a long period, has like the preceding produced many varieties, in which, however, the specific type is pretty well preserved—an indication, perhaps, that it does not cross so readily as some others. It should be noted, too, that in the majority the colour is either white or of a pinkish tint, rarely bright rose. Those with a decided shade of crimson probably owe this greater intensity of colour to a cross between the White Rose and some other species. Writers and horticulturists describe upwards of a hundred varieties of this handsome Rose; but we may limit ourselves to the following:—*Pompon Bayard*, *Placidie*, *Céleste blanche*, *Bouquet blanc Royale*, *Belle Aurore* (flowers white, tinged with yellow), *Perle de France*, *Cuisse de Nymphe*, *Diadème de Flore* (flowers large and very double, flesh-coloured, one of the most beautiful Roses known); *Félicité*, *Madame Legras*, *La Séduisante*, etc., are better known in this country.

R. tomentòsa, *R. villòsa*, and *R. Evratiàna*, belong to this tribe, but they are seldom cultivated, and have produced no noteworthy varieties.[1]

VII. Ròsæ Rubiginòsæ, the Sweet Briar and Eglantine Roses.—Very closely allied to the preceding tribe, from which they are distinguished by their curved suckers, and especially by the glandular under-surface of the leaves; a character almost exclusively confined to Roses of this section. They have the same persistent calyx-lobes and thick disk closing the mouth of the calyx-tube. There are only two species in this group which merit our attention, they are:—

R. lùtea, the Eglantine, which should not be confounded with *R. sulphùrea*, previously mentioned under the Burnet Rose section. This, which appears to be a native of the South of Europe, though it may be only naturalised, is a bush 3 to 6 feet high with straight prickles not intermixed with bristles, and shining dark-green leaves whose leaflets to the number of 5 to 7 are oval, slightly concave and toothed, and more or less pubescent and glandular beneath, and glabrous above. The flowers are large, cup-shaped, sometimes wholly yellow, sometimes yellow without and reddish brown within. Their odour, which has sometimes been compared to that of a bug, without being exactly disagreeable, but feebly recalls that of

[1] All the wild forms of this group are now usually considered as varieties of *R. canina*.

the other Roses. In most French works this species bears the name of Eglantine, and it is generally considered to be the veritable *R. Eglantèria* of Linnæus. It has produced comparatively few variations, and apparently no crosses. The *Capuchin Briar* (fig. 87), flowers yellow outside, and of a more or less vivid reddish brown inside; *Harrisònii*, with yellow



Fig. 87. Capuchin Briar. (½ nat size.)

double flowers, not uncommon in England; *Persian Yellow*, entirely of a bright yellow and very double, one of the prettiest yellow Roses we possess.

R. rubiginòsa, Sweet Briar, is found in some parts of England. A very dense bush about 6 feet high, bearing numerous curved spines; leaves usually of seven dull green leaflets, glandular below, and very odoriferous when bruised between the fingers. The flowers are rose or very pale carmine, slightly scented; the fruit very variable in shape, smooth or hispid, retaining the convergent calyx-lobes until ripe.

R. micrantha is a much commoner closely allied form with less strongly scented foliage and deciduous calyx-lobes.

VIII. Ròsæ Canìnæ, Dog Roses, in which the orifice of the calyx-tube, or more properly the receptacle, is contracted as in the preceding by the thickening of the disk, but differing from the species of that section by the absence of odoriferous glandular hairs on the leaves. Their suckers are curved, and armed with equal recurved spines. This group differs from the following in having always free styles. We here find many species of great interest to the gardener. They are as follow:—

Ròsa canìna, the true Dog Rose, is one of the commonest species. It abounds throughout Europe, and extends even to the northern parts of Asia. It commonly exceeds 6 feet in

height, but it varies excessively in this respect, as also in habit, according to climate and situation. This polymorphism, moreover, renders it very difficult to describe and distinguish, and the thirty or more species or sub-species into which botanists have cut it up have no well-defined characters. Its most constant characters are: to be unprovided with bristles mixed with the spines, to be glabrous, and to assume an obscure purple tint on the parts most exposed to the sun. The flowers are usually pale rose, more rarely white or inclining to carmine. Lastly, its ovoid-oblong fruits, scarlet when ripe, distinguish it from many neighbouring species where this organ is short and rounded. This Rose has not of itself yielded any garden varieties of note; but it is not improbable that some hybrid varieties have resulted from crosses of this with other species. Its importance as a stock for standard Rose-trees cannot be over-estimated, as it is very hardy, and produces clean straight stems admirably adapted for this purpose.

R. Índica, the Tea Rose, despite its name, came from China, where it has probably been cultivated from the most ancient times. It is, like our European species, very variable and uncertain in its characters; and it is questionable whether it would not be better to unite the following species with it, as some authors have done. For want of data we accept Lindley's opinion, who held it to be a distinct species.

It is a shrub 5 to 10 feet or more high, with long slender glaucous shoots with scattered hooked brownish spines. The leaves are shining, smooth, composed of 3 to 5 flat ovate-acuminate leaflets of a deep green above and glaucous below. Flowers large, rose, flesh or yellowish in colour, ordinarily semi-double, borne on scabrous elongated peduncles. The fruit is rounded in form, or shortly obovoid, reddish scarlet when mature. One of its varieties, by some distinguished as a species under the name of *R. odoratissima*, is remarkable for the fragrance of its flowers. The innumerable varieties which have been obtained from it, either directly or by crossing, are far from repeating exactly the characters that we have just assigned to the specific type.

The Tea Rose, one of the great modern acquisitions of horticulture, was introduced into Europe towards the end of the last century, though it is not known by whom, nor the exact year. What is certain, however, is that it was seen for the first time in 1793, in the garden of an English amateur

named Parsons; and it is also certain that it has since been introduced at different times by different travellers, notably by Mr. Evans about 1803 or 1804, and by Sir A. Hume in 1809. But what gives it its greatest value in the eyes of the amateur is the long duration of its flowering season, from early Spring till late in the Autumn.

The greater part of the varieties, and even hybrids, which it has produced since its introduction participate to a certain extent in this remarkable quality. We may cite amongst the most ancient varieties:—*Belle Gabrielle*, *Belle Eliza*, *Belle Hélène*, *Zénobie*, *Reine de Golconde*, *Roi de Siam*, *Carnot*, *Bengale Jaune*, *Aurore*, *Floralie*, *Moirée*, *Strombio*, &c. Among the more modern varieties we indicate the following, which have already become classical:—*Mélanie Willermoz* (fig. 88), large, full, white with salmon centre; *Safrano*, medium, double, light yellow or fawn; *Bougère*, large and very double, lilac rose or rosy bronze; *Devoniensis*, very large and full, pale or creamy yellow; *Gloire de Dijon*, very large and full, fawn shaded with salmon, one of the most splendid and useful Roses in cultivation, most likely of hybrid origin. We might add many more deserving of notice out of the hundreds of sorts found in catalogues; but it is evident that to do so would be of no great utility. It is almost superflous to say here that the Tea Roses are less hardy than most of the other groups, almost all except *Gloire de Dijon* requiring slight protection against frost even in the South of England.



Fig. 88. Tea Rose, Mélanie Willermoz. (½ nat. size.)

R. Bengalénsis, or *R. semperflòrens*, the Bengal or Perpetual Rose (fig. 89), united by most authors with the preceding, but which for horticultural purposes it is more convenient to keep separate. It is a somewhat spreading bush

with slender branches, armed here and there with curved prickles. Leaves shining, strongly tinted with dark purple, composed of 3 to 5 ovate-lanceolate dentate leaflets. Flowers solitary at the extremities of the branches, double or semi-double, deep crimson, almost scentless. The calyx-tube is shortly obovoid and glabrous, and the recurved calyx-leaves are deciduous. According to Dr. Lindley this is the only Rose that loses its stamens at the same time as the petals, a character which distinguishes it from the Tea Rose; but a still greater difference pointed out by that eminent botanist is the smaller number (about fifteen) of ovaries in each flower of the typical Bengal Rose, whilst the Tea Rose has from forty to fifty. The first Bengal Rose appears to have been introduced into England about the year 1771, by whom it is uncertain; but it is averred that an Englishman named Ker brought it from Canton in 1780, and that another Englishman, Slater, introduced a second variety from the same country about the same time. Hence the name China Rose, *R. Chinénsis*, given to it by some authors, whilst others consider it to be a mere variety of *R. Índica*. Innumerable varieties are referred to this species by horticulturists.



Fig. 89. Bengal Rose. (½ nat. size.)

It is scarcely possible to distinguish specifically the Bourbon Rose, *R. Borbònica* (fig. 90), from *R. Índica*, which differs only in its larger stature, the presence of bristles intermixed with the spines on the branches and petioles, leaves of 5 to 7 leaflets, and flowers in corymbs 3 to 7 on the same peduncle. It is very probable that it is not really indigenous in the Isle of Bourbon, but imported thither from China or India. Its in-

troduction into Europe dates from the beginning of the present century.

The numerous varieties belonging to this section are distributed by gardeners amongst the Tea, Bourbon, Hybrid Perpetual, etc., according as they favour one or the other of these groups. But from the continued crossing and recrossing which they have undergone, this classification is necessarily arbitrary, and merely serves as a comparative guide for the amateur. We must refer our readers to the nursery catalogues for detailed descriptions of these varieties.



Fig. 90. Bourbon Rose, William the Conqueror. (⅓ nat. size.)

There are Dwarf Roses in this group as well as in the Centifolia; but whether we regard them as distinct species, or simply varieties, is of no importance here. Amongst the number is Miss Lawrence's Rose (*R. Lawrenciàna*), a true miniature of the Bengal Rose. It rarely exceeds a foot or a foot and a half in height, and its very slender branches are armed with large and almost straight prickles. The bright purple semi-double flowers are produced in abundance throughout the Summer.

The Tea, Bengal, and Bourbon Roses are often crossed with other species in our gardens, but perhaps more frequently in furnishing than receiving pollen—if, at least, we can place any confidence in the statements of horticulturists, who affirm that these Roses are usually produced pretty faithfully from seed. Be this is as it may, it is very possible, as is supposed, that the Noisette Rose, *R. Noisettiàna* (fig. 91), is to be attributed to a cross between the Tea, or Bengal Rose, and *R. moschàta*, raised from seed in America by a French gardener named

Philippe Noisette, who sent it to France in 1814.[1] This Rose is a shrub 5 to 10 feet high, armed with strong hooked thorns;



Fig. 91. Noisette Rose. (⅓ nat. size.)

leaves glabrous, shining, usually composed of seven ovate-acute finely-toothed leaflets. The flowers, in the typical variety at least, are of medium size, numerous and double, bright rose and scented. But since its introduction into Europe, fecundated by itself or other species, it has given birth to a multitude of new varieties, in which the primitive type is more or less changed. In some the flowers are solitary at the extremity of the branches, and in others they are clustered; and in colour they vary from white and yellow to crimson, with every intermediate tinge. Few roses offer more decided evidence of hybridity. Among the white or flesh-coloured varieties we may adduce the following: *Aimée Vibert*, *Eudoxie*, *Labiche*, *Lamarque*, *Madame Deslongschamps*. Yellow varieties: *Solfaterre*, *Ophirie*, *Després*, *Marie Chargé*, *Euphrosine*, *Chromatelle*. Rose or carmine: *Bougainville*. Most of the foregoing varieties still hold their place in the garden; but there have

[1] It is, moreover, not impossible that the Noisette Rose was the result of a cross between the Tea Rose and an American species, *R. setigera*, of which we shall speak further on. The climbing habit of many Roses thrown into this class supports this supposition.

been many very beautiful additions of late years, including the famed *Maréchal Niel.* Some of the varieties of this class also are in bloom during the whole Summer and Autumn, which, coupled with the beauty of their flowers, causes them to be much sought after.

IX. Rosæ Systylæ: Roses with confluent styles.—This is the only distinctive character, but the leaves are often persistent, which may be considered as a secondary character. We have here:—

R. systyla, the Hill Rose, closely resembling the Dog Rose, from which it differs mainly in its confluent styles, and also in having usually more numerous-flowered corymbs, and the rather more persistent though always deciduous foliage. This bush is common in England and Northern France. By some authors it is united with the following.

Lady Monson's Rose, *R. Monsoniæ*, is attached to this as a variety, perhaps hybrid; but some authors have called it a distinct species. It was found in a hedgerow in England towards the end of the last century. This pretty somewhat dwarf variety is still preserved in the collections of some English amateurs.

R. arvensis, the Field Rose, is common all over Europe, including Britain. It is distinguished from the preceding by its more creeping shoots, unequal prickles, and by its leaves being glaucous beneath. The leaves consist of 5 to 7 small flat oval toothed leaflets. The flowers are solitary or clustered, small, single, scented, white slightly tinged with yellow towards the centre. The calyx-tube is obovoid and glabrous, and the mature fruit nearly round and scarlet.

It has been clearly demonstrated by the botanist Sims first, and subsequently by Dr. Lindley, that the Ayrshire Rose of English gardens, doubtless of hybrid origin, should be attached to the Field Rose.

This Rose, which has preserved most of the characters of *R. arvensis*, and particularly its confluent styles and perfect hardiness, has given birth to several varieties pretty widely spread in gardens, with double or semi-double white, pink, or bright carmine odoriferous flowers. The Rose *Williams's Yellow Briar*, sometimes classed with the Ayrshires, may itself be a mere hybrid. The Ayrshire Roses are, from their hardiness and rapid growth, admirably adapted for covering old trees, pillars, buildings, etc. One of the best is *Bennet's*

Seedling, or *Thoresbyana*, a very profuse small-flowered double white variety.

R. sempervìrens, the Evergreen Rose, a native of the Mediterranean region both in Europe and Africa. This is a climbing shrub with long slender branches armed with hooked prickles. Leaves shining, glabrous, composed of 5 to 7 ovate-lanceolate leaflets, persistent even in Winter. Flowers medium size, numerous, clustered, white, sweet-scented; styles coherent, forming a long hairy column. The orange-coloured fruit is small and round.



Fig. 92. Rosa multiflora. (½ nat. size.)

This has been under cultivation a long time, and has produced several esteemed varieties, valuable for the same purposes as those of the preceding species. We may mention as among the best, *Donna Maria*, pure white, medium size, and double; *Princesse Marie*, bright rose, double, and cupped.

R. multiflòra, the Many-flowered Rose (fig. 92), comes from China and Japan. A climbing shrub with slender flexible elongated branches armed with hooked prickles arranged in pairs below the insertion of the leaves. The latter are composed of about seven leaflets which are hairy on both sides, oval or lanceolate, and more or less acute. Flowers in dense clusters, small, very double, bright rose. The column of styles is slightly hairy. The calyx-leaves drop shortly before the turbinate bright red fruits become ripe.

This Rose is remarkable for the smallness of its white or rose flowers, which scarcely surpass those of the double cultivated Bramble. The wild type, very probably single, is unknown to us, and as the double variety (the only one we have from the extreme East) is usually sterile, no hybrid variety, of course, has been reported to which this has given birth; but there are several sub-varieties, which have been perpetuated by grafting. We append the names of the best: *Rose de la Grifferaie*, *Multiflore du Luxembourg*, and *Laure Davoust*.

The Chinese *R. anemonæflòra* might be placed next, as it resembles the foregoing in habit, but still it is better located in the following section.

R. moschàta, the Musk Rose, originally from Northern Africa, but now naturalised in Spain and about Roussillon. An erect much branched free-flowering shrub from 5 to 10 feet high, armed with hooked almost equal spines. Leaves of 5 to 7 ovate-lanceolate dentate leaflets, smooth and dull green above, glaucous below, with the midrib hairy. The flowers are generally in clusters of about seven, white, and very fragrant. Calyx-leaves deciduous, dropping soon after the fall of the petals. The fruit is small, obovoid, and red when ripe. This Rose has been cultivated from time immemorial in the countries bordering the Mediterranean Sea inhabited by Mussulman tribes, where it furnishes the bulk of the essence of Roses employed in the local perfumery. In our gardens it blooms late (August or September), and it has produced several semi-double varieties; among others the old *Double Musk* Rose, pure white; and *Comtesse de Plater*, white tinged with yellow. It is also supposed to have contributed pollen towards the production of some other hybrids, the Noisette for example, which we have already alluded to.

R. setigera, syn. *R. rubifòlia*, the progenitor of the Prairie Roses of English gardens, from North America. This should not to be confounded with *R. multiflòra*. A shrub 3 to 5 feet high, easily recognised by its short prickles, leaves of 3 to 5 ovate acute dentate leaflets, and its solitary or slightly clustered pale rose flowers about the size of those of the common Bramble. The fruit is globular, about the size of a pea, smooth and glabrous. This very distinct species differs notably in habit from all others of this section, but on account of the confluence of its styles it cannot be removed from them in a classification. It has given birth to some garden varieties not without interest, such as *Queen of the Prairies*, *Belle de Baltimore*, *Miss Edgeworth*, *Purpurea*, *Séraphine*, *Washington's Bride*, etc., mostly semi-double or double, some white or flesh, and others bright rose.

X. Ròsæ Banksiànæ, or Banksian Roses.—Usually climbing shrubs whose leaves have mostly no more than 3 to 5 leaflets. Their principal botanical character is in the stipules, which are almost free, narrow, acute, and nearly always deciduous. The styles are sometimes free and sometimes united. The species

are all from Eastern Asia and North America. We distinguish in this section :—

R. lævigàta (*R. Sìnica* of gardens), the Georgian Rose, has climbing naked or armed stems, leaves of three ovate-lanceolate rather coriaceous shining denticulate very glabrous leaflets. The flowers are solitary, large, and pure white. The ripe fruit is obovoid-oblong, red, clothed with spiny bristles, and surmounted by the calyx-leaves. This beautiful species has become naturalised in the woods of Georgia in North America, where it reaches the summits of the highest trees. It is supposed to be of Chinese origin, but it is not the true *R. Sìnica*, which differs in having prickles on its petioles, whilst in this species they are unarmed. It is probable that these two species, so admirably adapted for covering trellis-work, etc., will soon be introduced to our gardens, where they might compete with the following.

R. Bánksiæ, the true Banksian Rose, a native of China, is a climbing or trailing shrub, producing stems 30 feet or more in length in a more southern climate, though with us it requires a warm wall and slight protection in severe weather. It is almost totally unarmed, and perfectly glabrous, except upon the margin of the stipules, which are very deciduous, and upon the principal nerve of the leaflets. These are three to five in number, plane, oblong-lanceolate, and rather shiny. This Rose, one of the most beautiful of the genus, is a very abundant bloomer, with white, yellow, or salmon very double agreeably fragrant flowers produced in large clusters.

Banks's Rose, or, more strictly speaking, Lady Banks's Rose, so named by Robert Brown in honour of the wife of the celebrated patron of English botanists, was introduced into England for the first time about the commencement of the present century; but since then it has been re-imported several times, and the last time, in 1850, by Mr. Fortune, while travelling in China for the Royal Horticultural Society of London. These separate introductions have supplied us with different varieties, sufficiently diverse in the colour of the flowers, though agreeing in habit. The prettiest are: *Grandiflòra álba plèna*, with small quite white flowers; the Old Yellow, with double almost scentless flowers; and the Salmon-coloured Banksian, whose bronze flowers appear to be of a mixture of purple and yellow.

R. anemonæflòra, Anemone-flowered Rose, agrees but imperfectly with this group, though it would be difficult to find

it a better position. Its flowers are small, white and double, and sufficiently resemble, in the narrowness and number of petals, the flowers of our common garden Anemones. Like the preceding it comes from China, and is evidently modified by long culture. Several sub-varieties are reported, under the names *Centifolia*, *Pumila*, *Pompon Royal*, etc., which, however, might without inconvenience be reunited under the simple name borne by the species.

XI. Rosa berberidifolia, the Barberry- or Simple-leaved Rose, we merely mention to complete the series of Roses, for it is hardly known in our gardens. It is an undershrub 2 to 3 feet high, producing suckers abundantly, armed with prickles, and its simple leaves are obovate, denticulate, and destitute of stipules. The flowers are about the size of the Banksian, solitary, bright yellow, with a deep purple spot at the base of each petal. This curious species, by some botanists considered as forming the type of a distinct genus, under the name *Hulthèmia*, or *Lòwea*, is only found in the saline plains of the North of Persia and Soongaria, where it is so abundant that it is used for heating ovens. Its culture is difficult in the North, where it flowers without fruiting; but it would doubtless succeed better in the South, and probably some interesting varieties might be obtained, either directly or by crossing it with other species. In fact, one very curious hybrid exists already, known as *Hardyi*, the issue of a cross between *R. clinophýlla* and *R. berberidifòlia*, the latter furnishing the pollen. This hybrid resembles its mother in its compound leaves and large stature, and its father in its ternate prickles, and especially in its yellow flowers, whose petals bear a brown spot at the base.

Tribe VII.—*PÒMEÆ.*

Calyx-tube adnate to the ovary (or carpels immersed in the fleshy peduncle). Stamens numerous. Fruit pomaceous or drupoid. Trees and shrubs.

9. PŸRUS.

(Including *Cýdonia*, *Sórbus*, &c.)

Trees or shrubs. Leaves deciduous, simple or pinnate; stipules deciduous. Flowers white, pink, or rose, in terminal

cymes. Fruit fleshy, 2- to 5-celled, cells 1- or 2-seeded, cartilaginous. Between thirty and forty species are known, all of temperate and cold regions of the northern hemisphere. It is the Latin name of the Pear Tree. The Apple, Pear, Medlar, Service and Quince are all referred to this genus by some botanists. Some of the species are highly ornamental, and even the Apple and Pear trees may be classed in this category.



Fig. 93. Pyrus spectabilis. (¼ nat. size.)

1. *P. spectábilis.* Chinese Crab (fig. 93).—This is the handsomest of this section, and very conspicuous in Spring from the abundance of its rosy pink or nearly white flowers. Leaves oblong-lanceolate or elliptical, finely serrated, acute, glabrous above, slightly hairy beneath, veins prominent, petiole slender, stipules small. Fruit spherical, about an inch in diameter, on long slender peduncles. A native of China. There are several varieties, that called *floribúnda* being perhaps the best. *Alba plèna* has double white flowers; and there are two or three Japanese varieties of weeping habit. *P. Sinénsis* of gardens is the same thing.

2. *P. prunifòlia.* Siberian Crab.—A very ornamental tree of small dimensions. Leaves oblong, obovate, or nearly rotundate, serrate, often oblique at the base, glabrescent; petioles relatively long. Fruit depressed at the base, on long slender peduncles, and crowned by the persistent calyx-lobes. There are several handsome varieties, differing in the size and colour of the fruit, from scarlet and yellow to green and variously striped.

3. *P. coronària.* American Crab.—A small tree with oval or ovate leaves rounded at the base, irregularly toothed or lobed, and ultimately glabrous. Flowers corymbose, pink and white, rather large and fragrant; petals distinctly clawed. Fruit small, green, concave at the base. North America.

4. *P. baccàta*, including *P. cerasífera.* Cherry Crab.—This differs in its varieties from the Siberian Crab in the very glabrous glossy leaves and usually smaller fruit, from which

the calyx-lobes fall early, giving it a naked appearance. This is also a native of Northern Asia.

5. *P. torminàlis.* Wild Service.—A small indigenous tree. Leaves glabrescent, ovate or cordate, more or less deeply lobed. Flowers corymbose, small, white. Fruit globose or pear-shaped, brown.

6. *P. Ària.* White Beam Tree.—A shrub or small tree, very variable in foliage. Leaves lobed, pinnatifid or pinnate at the base, with a dense flocculent down on the under surface. Flowers in loose corymbs, small, white. Fruit spherical, half an inch in diameter, red or scarlet.

7. *P. Aucupària.* Mountain Ash or Rowan Tree.—An elegant native tree of small dimensions. Leaves imparipinnate, with about 7 or 9 oblong serrate leaflets. Flowers small, white, in large terminal dense corymbs. Fruit small, globose, scarlet. The scarlet berries of this tree, which are usually borne in great abundance, render it highly attractive towards Autumn.

8. *P. doméstica.* True Service.—Very much like the preceding, but the buds are smooth, the flowers panicled, and the fruit larger and pear-shaped or obovate.

P. Japónica (fig. 94), syn. *Cydònia* or *Chænómeles Japónica.*—This is one of the most ornamental of early-flowering shrubs, its brilliant scarlet flowers appearing in great profusion towards the end of Winter, before the leaves are developed. It is also remarkable for the leafy kidney-shaped stipules. Besides the common variety, which is perhaps the best, there is a white, a flesh, a red bordered with white, a semi-double, and several other varieties.



Fig. 94. Pyrus Japonica. (⅛ nat. size.)

10. CRATÆGUS.

Deciduous trees or shrubs, often armed with sharp spines. Leaves variable. Calyx-limb persistent. Fruit ovoid or spherical, with hard bony cells or stones. The species are

numerous, and distributed throughout the northern temperate zone. The name is from *κράτος*, strength, referring to the durable wood.

1. *C. Oxyacántha*, including *C. monógyna* (fig. 95). Whitethorn, Hawthorn, May, or Quick.—A common native



Fig. 95. Cratægus Oxyacantha. (¼ nat. size.)

bush or small tree extensively employed for hedges. In a wild state the flowers of this species vary from pure white to pink, and the foliage in size and beauty; but under cultivation it has produced many exceedingly handsome varieties far superior to the ordinary forms. These varieties include double white, pink, and scarlet flowers, with correspondingly larger and bolder foliage, and also variegated and weeping forms.

2. *C. Pyracántha.*—A very distinct species with small persistent lanceolate or oblong acute serrate leaves and pinkish or white flowers succeeded by dense clusters of orange-scarlet berries, which hang during the greater part of the Winter. This species is very commonly used and very suitable for covering walls. A variety exists with white berries. A native of the South of Europe.

3. *C. coccínea.*—A handsome shrub or small tree with a few straight thorns or unarmed, large ovate-cordate or oblong angularly lobed and toothed glabrous leaves on rather long petioles. Flowers large, in lateral corymbs, white; anthers red. Fruits large, bright red, very effective in Autumn. A native of North America.

4. *C. Crus-gálli.* Cockspur Thorn.—A small shrub or tree beset with strong curved spines. Leaves glabrous and glossy above, lanceolate or oblong-cuneate, narrowed into a short petiole, serrulate or irregularly lobed. Flowers large, white. Fruits bright red and showy. There are several varieties, such as *ovalifòlia*, *pyracanthifòlia*, etc. It is also known under the names *lùcida* and *laurifòlia*.

C. pyrifòlia and *C. prunifòlia* are varieties of an allied North American species, *C. tomentòsa*: the former has very large oblong irregularly toothed leaves, large corymbs of white flowers, and orange pear-shaped medium-sized fruits; and the latter has smaller scarlet fruits, though otherwise very much like the Cockspur Thorn, except in the pubescence of some parts. *C. Douglásii* is another of the same group with reddish twigs and oval or roundish cut and serrated glabrous leaves. *C. Mexicàna* is an American species, rarer in cultivation, and certainly not so ornamental as some of the above. *C. Azaròlus* is a South European species, in the way of the common Hawthorn, with thicker leaves having broader woolly segments, and larger yellow or pale red berries.

11. COTONEÁSTER.

Trees or shrubs, erect or decumbent. Leaves alternate, very small and persistent, or larger and deciduous. Flowers in sparse axillary or terminal cymes, or solitary, small, white, with calyx woolly on the outside. Fruit a drupe containing 3 to 5 hard 1-seeded stones. About fifteen species are reported, from Europe, North Africa, Asia, and Mexico. The name is said to be derived from *cotoneum*, a quince, and *aster* (*ad instar*), likeness, from the similarity in structure.

Deciduous Species.

1. *C. vulgàris.*—A small erect shrub. Leaves small for this section, about 1 to 2 inches long, oblong, ovate or rotundate, pubescent beneath. Flowers small, pink, in axillary cymes. Berries spherical, shining, scarlet, yellow, or black. A rare native, but common on the Continent.

2. *C. affìnis.*—A small tree with ovate-lanceolate mucronulate quite entire leaves about 3 or 4 inches long, glabrous above, hairy beneath. Flowers in large cymes. This and the following are used as stocks for grafting the evergreen sorts

upon, but they are none the less devoid of interest in themselves. Nepal.

3. *C. frígida.*—A more robust growing tree, larger in all its parts. The large clusters of scarlet berries form the chief attraction of these trees. This and the last are considered to be mere forms of *C. bacillàris*, a common Indian species.

4. *C. Simónsii.*—This species is intermediate in character between the deciduous and evergreen. Leaves about an inch long, oval, acute, entire, sparsely clothed with silky hairs, persistent in mild winters. Flowers few together, nearly sessile on short lateral branches. Berries oblong, bright, vermilion coloured, persistent through the Winter. Although deciduous this is one of the most desirable shrubs of this genus.

Evergreen Species.

5. *C. microphýlla.* — Branches thick. Leaves crowded, about 3 or 4 lines long, oblong, obovate or obcordate, dark green and shining above, hairy beneath. Flowers sub-solitary on the short lateral branches. Berries turbinate or spherical, dull red. This is valuable for covering walls, banks, etc. Nepal.

6. *C. Wheéleri.*—Branches long and slender. Leaves distant, about an inch long, oblong, elliptical or obovate, mucronulate, dark green and shining above, densely hairy below. Berries spherical, dull red. Very pretty as a standard, but it does not appear to produce its fruit so freely as some of the other species.

7. *C. buxifòlia.*—A small shrub near the last with smaller obovate or rotundate leaves. Berries scarlet, obovate or turbinate. Flowers sub-solitary, rather large. Northern India.

8. *C. thymifòlia.*—A prostrate creeping shrub resembling No. 5 in foliage; but the lateral branches are elongated, the leaves narrow, oblong or obovate, not glossy, and of a paler green. This species rarely produces berries on young plants. Northern India.

12. PHOTÍNIA (including *Eriobótrya*).

Evergreen shrubs or trees with large simple coriaceous entire or toothed leaves. Flowers numerous, small, white, in terminal panicles or corymbs. Calyx-lobes persistent. Berry 1- to 5-celled, walls of the cells not bony. About twenty species, inhabiting the mountains of India, a few reaching

China, Japan, and California. Name from φωτεινός, shining, from the laurel-like foliage. Handsome shrubs, requiring protection in very severe weather.

1. *Ph. serrulàta*, syn. *Cratægus glàbra.*—A handsome shrub with large Laurel-like coriaceous leaves and terminal flat corymbs of small white flowers. A native of China and Japan.

2. *Ph. arbutifòlia*, syn. *Cratægus arbutifòlia.*—As the name implies, the foliage of this closely resembles that of the common Arbutus. The flowers are larger, in an elongated panicle, and the petioles and young branches bright red. This is a native of California.

3. *Ph. Japónica*, syn. *Eriobótrya Japónica.* Loquat.—Leaves large, oblong, rugose, downy beneath. Flowers white, appearing in November. Fruit about the size of a small apple, pale orange-red, rarely produced in the open air in England, even against a wall. The fruit is edible, and grown in considerable quantities in the South of France. A native of China and Japan.

13. RAPHIOLÈPIS.

Evergreen shrubs or trees with simple coriaceous leaves and white or pink flowers. Calyx-limb deciduous. Berry pulpy, 1- or 2-celled, 1- or 2-seeded. A small genus of about five species from Japan and China, closely allied to *Photínia.* Name from ῥαφίς, a needle, and λεπίς, a scale, referring to the slender bracts.

1. *R. ovàta.*—A handsome shrub with glossy dark green oval or obovate leaves crowded at the end of the branches. Flowers white, fragrant, about eight lines in diameter, arranged in large terminal thyrsoid panicles. Japan.

14. AMELÁNCHIER.

Small trees or shrubs with alternate simple deciduous leaves and white racemose flowers. Calyx urceolate; lobes persistent. Berry imperfectly 4- to 10-celled; cells 1-seeded. Only four species are known, but they are widely dispersed, occurring in the Mediterranean region, Japan, and North America. *Amelanchier* is the Savoy name of the Medlar. *A. vulgàris* and *A. Canadénsis* with their varieties are elegant small trees with oblong, oval or nearly orbicular toothed leaves and white racemose flowers in early Spring. Some of the

varieties are very hairy when young, but eventually become glabrous. *A. spicàtus*, *A. Botryàpium*, *A. ovàlis*, &c., are slight varieties. In fact, we have been unable to find constant characters to separate European and American forms. Those adduced by Koch break down when tried with a complete series of specimens.

Order XXXIX.—SAXIFRÀGEÆ.

(Including *Escallonièaceæ*, *Hydrangeàceæ*, *Cunoniàceæ*, *Francoàceæ*, *Grossulariàceæ*, *Philadélpheæ*, &c.)

Trees, shrubs, or herbs of variable habit. The structure of the flowers in this order is very similar to that of the *Rosàceæ*, and in some species so close as to render it a matter of doubt to which order they should be referred. The tendencies in this group are to few stamens, united carpels with numerous seeds, and abundant albumen. 73 genera, including about 540 species, are brought together under this order. They inhabit all countries.

Tribe I.—*SAXIFRAGEÆ.*

Herbs, often scapigerous. Leaves usually alternate. Flowers nearly always pentamerous. Fruit 1- to 3-celled.

1. ASTÍLBE (*Hoteía*).

Tall branching herbs with triternate leaves and membranaceous stipules, having the aspect of some Spiræas, and very near them in structure; but differing in the stamens not exceeding 8 or 10, and the carpels 3, and the numerous albuminous seeds. The few species known are from the Himalayas, Java, Japan, and North-eastern America. The name is derived from ἀ privative and στίλβη, brilliancy, in allusion to the inconspicuous flowers of some of the species.

1. *A. barbàta*, syn. *A. Japónica*, *Hoteía barbàta*, *H. Japónica*, *Spirǽa barbàta* and *S. Japónica*.—The latter is the name it usually bears in gardens, though it does not belong to that genus. This is a very handsome plant, and now very extensively cultivated. It grows about 18 inches or 2 feet high, with triternate or pinnate leaves on long petioles. Leaflets serrated, bearded with rufous bristly hairs, especially on the joints of the petiolules, hence the specific name. The

flowers are small, pure white, in large branching racemose panicles; branches red. It blooms in the open air towards the end of May; but its chief value is for forcing for conservatory and window decoration. A native of Nepal and Japan.

Two or three other species are less frequently grown: *A. decándra*, about two feet high, with biternate leaves and white flowers, from Carolina; *A. rivulàris*, with reddish flowers, from Nepal. *Heuchèra*, *Mitélla*, and *Tiarélla* are allied genera of less interest, with rose or white flowers.

2. SAXIFRÀGA.

Perennial or annual herbs, of various habit. Leaves small and rosulate or rarely large, with sheathing petioles. Calyx-tube short or long, free or adnate to the base of the ovary, 5-lobed. Petals 5, rarely unequal, sometimes fringed or glandular, perigynous or nearly hypogynous. Stamens 10, rarely 5, inserted with the petals. Capsule 2-celled, with 2 beaks, seeds numerous. About 160 species, chiefly from the mountains of the north temperate zone and arctic regions, a few extending to South America. The name is from the Latin *saxum*, a stone or rock, and *frango*, to break, from the reputed property of some species to break stone in the bladder, or the rocks they grow upon.



Fig. 96. Saxifraga crassifolia. (¼ nat. size.)

1. *S. crassifòlia* (fig. 96).—About a foot high, with dark green glossy leaves and pink or purplish flowers, rarely exceeding the leaves, and appearing in March. This is a native of Siberia, and a common plant in gardens. *S. ligulàta*, *S. ciliàta*, and *S. cordifòlia* belong to this group. The first has strap-shaped glabrous fringed leaves and red or white flowers in May, and is a native of Nepal; the second, from the same country, has roundish hirsute and ciliate leaves and purplish flowers; and the third has deeply cordate leaves

and purple flowers. It is a native of Siberia, not very distinct from the one figured. *S. purpurascens*, from Northern India, is the best of this section, but not quite hardy, and very rare.

2. *S. umbrosa.* London Pride, None-so-pretty, St. Patrick's Cabbage.—This old favourite is so familiar as to render description almost superfluous. Leaves in dense tufts, obovate, crenate, narrowed at the base; petiole ciliated. Flower-stem leafless, slender; cymose flowers small, white or pink spotted with red or purple. There are several varieties of this and *S. Geum*, all of which are referred to one species by some writers. The extreme form of the latter has orbicular leaves, cordate or rounded at the base; but some of the varieties are intermediate between the two. Both are indigenous in Ireland and South-western Europe.

3. *S. granulata.*—This species belongs to another distinct section with radical palmately lobed leaves, suberect sepals, and white petals. It is a native, and the only lowland species with the exception of the inconspicuous *S. tridactylites*, usually found on walls and buildings, extending to the South of England. It is distinguished by its granular bulbous roots and petiolate reniform-palmate glandular leaves. Flower-stems about a foot high. There is a double variety in cultivation. *S. cernua* is a similar but smaller plant, from mountainous districts of the north.

4. *S. Hirculus.*—The representative of a group with leafy stems and yellow petals and free sepals. In this species the radical leaves are rosulate, petiolate, lanceolate, and the cauline linear. A dwarf stoloniferous plant with few or solitary yellow flowers. Native of the northern parts of Britain, and widely distributed in Arctic and Alpine Europe, Asia, and North America.

5. *S. oppositifolia.*—The type of a section with opposite leaves, furnished with a pore at the tip. The present species grows in tufts. Stems slender, 2 to 3 inches high, thread-like, with a few small glabrous thick dark green leaves, and a comparatively large solitary terminal purple flower. A native species, and like the last of very wide distribution. This is a handsome little plant, flowering in Spring from April to June. There is a white and also a pink variety. *S. biflora*, *S. Kochii*, and *S. retusa* are closely allied species.

6. *S. hypnoides.*—Perennial, with many leafy flowerless shoots, alternate palmately lobed leaves, white flowers, and

glandular articulate hairs. This species grows in dense tufts, the prostrate stems slender, often of considerable length. Leaves narrow, simple or 3-lobed; lobes acute. Flower-stems with few leaves. Common in the North of England and Scotland, and elsewhere in Europe. *S. cæspitòsa*, an indigenous species with obtusely lobed leaves and fewer barren shoots; *S. muscoìdes*, *S. Androsàcea*, and a host of other Alpine species belong to this section; and *S. ceratophýlla*, a very handsome allied species of dwarfer growth, with rigid sharply-cut leaves and relatively large white flowers, is a native of South-western Europe.

7. *S. Aizòon.*—A dwarf herb less than a foot high with rosulate oblong or ligulate leaves margined with sharp teeth and a grey incrustation, and pinkish white flowers. A native of the Alps of Europe. This and many other species with incrusted leaves are more curious and interesting than ornamental. *S. Cotylèdon* has tall branching flowering stems 2 to 3 feet high and white flowers; and *S. aretioìdes* is a diminutive plant about 2 inches high with glandular spathulate leaves and few yellow flowers. Both are found in the Pyrenees. *S. Andréwsii* and *S. Guthrieàna* are hybrids, between this and the *umbròsæ* section.

3. PARNÁSSIA.

Stemless herbs with radical entire leaves and 1-flowered scapes. Flowers white or pale yellow, about an inch in diameter, pentamerous, 5 fertile and 5 sterile stamens alternating. Capsule 1-celled, loculicidally 3- or 4-valved, many seeded. About twelve species, from the northern temperate and frigid zones.

1. *P. palústris.* Grass of Parnassus.—An indigenous species. Leaves cordate-ovate, acute, one to two inches long, on slender petioles. Scape about a foot high, with one sessile leaf about the middle.

P. asarifòlia with reniform leaves, and *P. Caroliniàna* with cordate-ovate obtuse leaves, are North American species. All are very pretty and interesting.

Tribe II.—*FRANCÒEÆ.*

Scapigerous herbs with the parts of the flowers in fours. Stamens 4 or 8. Natives of Chili.

4. FRANCÒA.

Leaves crowded, lyrate-pinnatifid or pinnate, glandular-toothed. Flowers in erect elongated racemes, petals and sepals equal. *Tetílla*, an allied genus, has very unequal petals and sepals. There are three or four species or varieties of similar habit and appearance.

1. *F. sonchifòlia.*—This species grows about 2 or 3 feet high, unbranched, with purple flowers appearing in Summer.

Tribe III.—*HYDRÁNGEÆ.*

Shrubs with opposite simple exstipulate leaves. Petals usually valvate, and stamens epigynous. Ovary 3- to 5-celled.

5. HYDRÁNGEA.

Erect or climbing shrubs. Leaves persistent or deciduous, entire, toothed or lobed. Flowers in large terminal corymbs or panicles, fertile small, sterile large and apetalous. Petals 4 or 5, valvate. Styles 4 or 5, free, or connate at the base. Fruit small, capsular; seeds numerous, minute. Between twenty and thirty species, chiefly Asiatic, a few from North America. The name is a compound of *ὕδωρ*, water, and *ἀγγεῖον*, a vase, from the cup-shaped fruit.

1. *H. Horténsia* (fig. 97).—The form originally introduced under this name is the most familiar in cultivation, and one of the most desirable of dwarf flowering shrubs, especially in the south, in the vicinity of the sea. In some varieties nearly or quite all the flowers are sterile, the lobes of the calyx being greatly expanded, and pink, white or blue, according to the nature of the soil; and in others only the outer flowers are sterile. The same curious transformation may be seen in the wild and cultivated varieties of the Guelder Rose. A native of Japan, introduced in 1790. The following forms, also Japanese, are with the foregoing all considered as varieties of one species; but, as varieties, many of them are very distinct and beautiful. *H. Japónica roseo-álba* has the outer flowers only radiate, having either white or rosy toothed petals; *H. Jap. cæruléscens* has bright blue ray-flowers. *H. Otáksa*, very near the common *Horténsia*, with nearly all the blue flowers sterile, and in very large panicles; *H. stellàta prolífera*

has pink flowers with several series of sepals in the sterile ones; *H. Azisài*, with ray or barren flowers on very long pedicels.



Fig. 97. Hydrangea Hortensia. (⅛ nat. size.)

The above varieties differ considerably in the size, pubescence and form of the foliage, but there is a general resemblance not easily mistaken. We must not omit to mention that there are some varieties prettily variegated in the foliage with red or yellow.

H. paniculàta is a distinct species, in which the inflorescence is elongated, not flat or rounded. The variety *grandiflòra* is a magnificent plant, in which all the flowers are sterile and pure white, forming a very large panicle. *H. Thunbérgii* is a more slender species, with much smaller foliage, and flat cymes of blue flowers. The form in cultivation has a few of the outer flowers only barren, with rounded striated sepals. *H. scándens*, including *H. petiolàris*, is of climbing habit, and differs from all the preceding in the petals, which cohere at the tips and fall together. *H. arboréscens* is an American species of larger stature, with inconspicuous greenish-white flowers, few of which are sterile and enlarged. *H. quercifòlia*, another American species, has lobed leaves and terminal panicles of greenish white or pink flowers, in part barren.

6. DEÙTZIA.

Small deciduous shrubs with opposite branches and minute stellate often rough hairs. Leaves ovate or lanceolate, serrulate. Flowers scentless, white or pink, solitary, racemose or corymbose, axillary or terminal. Petals 5, induplicate or imbricate. Stamens 10, epigynous; filaments often dilated, and furnished with a lobe at the apex on each side of the anther. Fruit capsular, small, globose, 3- to 5-celled, many-seeded. About half a dozen species are known, nearly all of which are or have been in cultivation. The name is commemorative of one of Thunberg's assistants in Japan.



Fig. 98. Deutzia gracilis. (¼ nat. size.)

1. *D. grácilis* (fig. 98).—This is the smallest species, and at the same time the prettiest in cultivation, the habit being less straggling than in the other species. It grows from 1 to 2 feet high, with numerous slender stems and smooth leaves and small numerous white flowers. It is quite hardy in the south, though a very severe season will destroy the beauty of the blossom; but for early forcing it is almost without a rival. A native of Japan.

D. crenàta, syn. *D. scàbra* of gardens. A very handsome erect shrub with slender stems from 4 to 8 feet high. Leaves ovate-lanceolate, rigidly serrulate, rough to the touch. Flowers racemose or paniculate. The single-flowered white variety is usually known by the latter name, and the double varieties by the former, as *crenáta flòre plèno*, and *purpùrea plèna*. The first of these two varieties has pink and white flowers, and is already widely grown; but the second is of quite recent acquisition. Japan. The true *D. scàbra* does not appear to be in cultivation.

D. Fortùnei appears to be a form of the foregoing, that is if we have seen the right plant. The Himalayan species *corymbòsa* and *staminèa* have almost disappeared from our gardens. They are both very showy species, with cymose or corymbose white flowers and foliage similar to *crenàta*.

Decumària sarmentòsa is an allied American plant of climbing habit with small white odoriferous flowers having 7

to 10 petals, numerous stamens, subulate filaments, and only one style. *Platycràter Sieböldii*, syn. *P. argùta*, is a recently introduced Japanese shrub with lanceolate dentate deciduous leaves and white Philadelphus-like flowers, remarkable for the 4-valvate petals and 2 slender styles.

7. PHILADÉLPHUS.

Deciduous shrubs, differing from the last genus in having larger often sweet-scented flowers, 4 or 5 imbricate petals, numerous stamens, and slender filaments. The species, of which there are about twelve, are natives of Central Europe, Himalayas, Japan, and North America. The Greek name of a shrub. These beautiful hardy flowering shrubs are popularly known under the name of Syringa (Seringat, French) or Mock Orange.

1. *Ph. coronàrius.*—This is the common European species, of which there are several varieties in cultivation, including a double-flowered one, and one with variegated foliage. It grows from 4 to 8 feet high, with ovate acuminate serrulate glabrescent leaves and racemes of creamy-white fragrant flowers, appearing in May.

2. *Ph. Gordoniànus* (fig. 99).—A very handsome and desirable American species with flowers nearly double the size of those of the common one. This does not bloom till the latter end of June or beginning of July.



Fig. 99. Philadelphus Gordonianus. (½ nat. size.)

3. *Ph. grandiflòrus*, syn. *Ph. speciòsus*, *Ph. latifòlius*, etc.—A shrub 6 to 10 feet high. Leaves pubescent when young, ovate-acuminate or nearly rotundate, irregularly toothed.

Flowers white, large, sweet-scented, appearing in June or July North America.

4. *Ph. inodòrus.*—In this species the leaves are quite glabrous, very obscurely toothed, acuminate and ovate or lanceolate in outline. Flowers white, large, scentless, terminating the short lateral branches. This blossoms about the same time as the last. North America. *Ph. Lewisii* and *Ph. hirsùtus* are also North American species. These have smaller flowers, and the latter is a very dwarf hairy shrub. *Ph. Satsumi*, syn. *Ph. Chinénsis*, is a slender-growing species with long narrow leaves and large white flowers; from Japan.

Tribe IV.—*ESCALLÒNIEÆ.*

Trees or shrubs with alternate exstipulate simple often glandular-serrate coriaceous leaves. Stamens of the same number as the petals.

8. ESCALLÒNIA.

A South American genus of evergreen shrubs with white or red flowers in terminal panicles, or more rarely axillary. Calyx superior. Petals 5, linear-spathulate, with an erect claw and spreading limb. Stamens 5, epigynous. Fruit capsular, 2- or 3-celled, many-seeded; seeds minute. Named in honour of Escallon, a Spanish traveller. Some of the species are hardy in the South-west of England, where they succeed well near the sea.

1. *E. macrántha.*—This is one of the best, having rather large crimson-red flowers. It is a branching erect shrub about 6 feet high, glandular-pubescent on the younger parts. Leaves oblong or elliptical, serrated, coriaceous, shining, glandular-dotted below. Chiloe.

2. *E. rùbra.*—A more slender species with obovate deeply-serrated leaves and smaller flowers. There are two varieties, one with red flowers, and the other white. Chili.

E. pterocl̀adon, from Patagonia, is a very different plant with small leaves and small axillary white and pink flowers. It is remarkable for its winged hairy branches. *E. floribúnda* is an evergreen shrub with Arbutus-like leaves and numerous white flowers.

Ìtea Virgínica, an allied deciduous shrub from North America, resembles the Willow in habit, hence the generic

appellation. It rises to a height of about 6 feet. Leaves ovate-lanceolate, dentate, acute. Flowers small, white, in dense terminal racemes or spikes.

Tribe V.—*RIBÈSIACEÆ.*

Shrubs with alternate simple deciduous leaves. Stipules adnate to the petiole or absent. Flowers usually racemose. Ovary inferior, 1-celled ; seeds immersed in pulp.

9. RÌBES.

Spiny or unarmed. Calyx-limb 5-parted, usually coloured. Petals small, alternating with the stamens on the throat of the calyx, often scale-like and inconspicuous. Upwards of fifty species are described, inhabiting Europe, temperate Asia, and America. *Ribas* is the Arabic name of a medicinal plant. The Currants and Gooseberries of our gardens are types of this genus. The following are a few of the showiest ornamental species.

Unarmed Species.

1. *R. sanguíneum* (fig. 100). — This species, of North American origin, is now very common in our gardens, and de-



Fig. 100. Ribes sanguineum. (¼ nat. size.)

serving of a place in every shrubbery. Its deep red flowers are produced in great abundance in early Spring. There are several varieties of it, differing in the colour of the flowers, including white, pink, and crimson, and there is a variety with

double flowers. *Malvàceum* and *supérbum* are amongst the best. *R. Gordoniànum*, having red flowers tinged with yellow, is a hybrid between this and the following species, partaking of the characters of both, but less desirable than either of the parent species.

2. *R. aùreum.* — Leaves glabrous, shining, irregularly lobed. Flowers yellow, the small petals bordered with red. The habit of this is more spreading than in the preceding. It is also a native of North America.

Spiny Species.

3. *R. speciòsum*, syn. *R. fuchsioìdes.*—This is an extremely handsome shrub with small irregularly toothed and lobed oblong leaves and crimson flowers remarkable for the long exserted stamens, resembling in this respect some of the Fuchsias. The whole plant is more or less spiny and glandular-hispid. A native of California, flowering in Spring.

4. *R. níveum.*—Similar in habit and foliage to the last, but with smaller white axillary flowers having exserted though less conspicuous stamens. It is also from the same regions.

Order XL.—CRASSULÀCEÆ.

Usually fleshy herbs with alternate or opposite leaves, often crowded at the extremities of the branches in rosettes; stipules none. Flowers regular, cymose. Sepals free, persistent, 3 to 5, rarely more; petals of the same number, free or connate. Stamens perigynous, or almost hypogynous, as many or twice as many as the petals. Carpels 3 to 5, seldom more, free, many-seeded; seed small, albuminous. About 400 species, in 14 genera, chiefly from temperate and warm countries, rare in Australasia. Most of the members of this family are only suitable for rock-work or in very dry soil, but a few species are familiar, and some have lately been introduced into the geometrical flower-garden to contrast with its highly coloured occupants. *Echevèria metállica* is one of the most conspicuous of this class.

1. CRÀSSULA.

Dwarf herbs, rarely frutescent. Petals 5, free, or connate at the base only. Stamens and carpels of the same number. Leaves sessile, opposite, usually more or less fleshy, entire,

glabrous, or ciliate. Nearly all of the species, numbering 150, are from South Africa, a few from the Himalayas. There are no hardy species in cultivation, but some of them are employed for bedding out in Summer. The name is the diminutive of *crassus*, thick or fleshy.

1. *C. coccínea* (fig. 101), syn. *Kalosánthes coccínea.*—This is the only species in general cultivation. It grows about 2 feet high, and produces large clusters of crimson, scarlet, rose or pink flowers, according to the varieties.



Fig. 101. Crassula coccinea. (⅓ nat. size.)

2. SĔDUM.

Succulent usually prostrate herbs with alternate opposite or whorled leaves, seldom in rosettes. Parts of the flower in fives or fours; stamens twice as many as petals. 120 species, chiefly from the temperate and frigid zones of the north. Name from *sedeo*, to sit, referring to the prostrate habit of most species on rocks and stones.

1. *S. ácre.* Biting Stonecrop, Wall Pepper, or Poor Man's Pepper.—This indigenous trailing yellow-flowered species is perhaps the commonest in cultivation. It spreads so rapidly that it is well suited to cover rock-work, &c. It is quite glabrous, with small scale-like imbricate leaves and numerous flowers rising only a few inches from the ground.

2. *S. reflĕxum.*—Another yellow-flowering species, growing from 6 inches to a foot high. Leaves crowded, cylindric, reflexed, about an inch long. Flowers in terminal flat cymes. This species spreads very fast, and has become naturalised in several parts of Britain.

3. *S. álbum.*—Flowering-stems erect. Leaves glabrous, cylindric, oblong, about 6 lines long. Flowers white. A native of North Britain.

4. *S. Telèphium*, syn. *S. purpùreum.* Orpine.—Stems

about a foot high. Leaves broad, 1 to 3 inches long, ovate or oblong, flat or concave, obtusely serrate. Flowers rose, purple, white, or speckled, in dense corymbose cymes. An indigenous plant.

5. *S. Rhodìola.* Rose-root.—This species has dicœcious flowers. It grows about a foot high, with obovate or lanceolate acute glaucous leaves toothed towards the tip, the upper ones largest. Flowers purplish or yellow, in compact cymes. A native species, frequently seen in old gardens.

6. *S. Sieböldii.*—A distinct species with erect or ascending slender stems. Leaves opposite or in threes, flat, orbicular, and glaucous. Flowers in dense corymbs, very showy, pink or red. A native of Japan, and an old inhabitant of our gardens. There is a variegated form.

7. *S. Fabària.*—Near the foregoing, but taller and handsomer, and also a native of Japan. Leaves broadly oval, crenate. Flowers rosy purple. Both this and the last bloom towards the end of Summer.

8. *S. Ewérsii.*—A dwarf species with glaucous oblong-orbicular crenate flat glabrous leaves and rosy purple flowers in large corymbs. One of the best. A native of Siberia, flowering in Summer.

3. SEMPERVÌVUM.

Leaves usually thick and fleshy, usually in dense rosettes. Parts of the flower in sixes or more. Stamens usually double the number of petals. Species numerous, from the Mediterranean region, Atlantic islands, &c. The name is from *semper*, ever, and *vivo*, to live.

1. *S. tectòrum.* House Leek.—This is the tufted plant so frequently seen growing in patches on old houses and outbuildings in this country. Leaves glandular-pubescent, ciliate, obovate-lanceolate, mucronate. Flower-stems about a foot high; flowers dull purple.

Besides the above there are several other species occasionally met with in collections, and some are now employed for bedding purposes. *S. calcàreum*, syn. *S. Califórnicum* of gardens, a European species, is the one most commonly employed. This has broad rosettes of oblong glaucous leaves with dark tips and purplish flowers. *S. arachnoìdeum*, *arenàrium*, *globíferum*, *Ruthènicum*, and many others, are coming into general cultivation.

Grammánthes gentianoìdes, a native of South Africa, is a

pretty dwarf annual about 6 inches high with a profusion of crimson or scarlet flowers tinged with yellow. *Cotylèdon Umbílicus*, the Navelwort or Pennywort, found growing on dry banks and walls, also belongs to this group.

Order XLI.—DROSERÀCEÆ.

The Sundew family deserves mentioning here, though it is very rare that attempts are made to cultivate any of the species. They are distinguished by their free ovary with numerous seeds on parietal placentas and glandular leaves. *Dionæa muscípula*, Venus's Flytrap, is sometimes met with. It is a native of North America, and remarkable for the irritability of its leaves, which close upon being touched. *Drosophýllum Lusitánicum* is a very showy shrubby plant, from Portugal, bearing large terminal corymbs of pale yellow flowers. With the exception of the last-mentioned plant, which grows in sandy places, nearly all the members of this order inhabit boggy or marshy localities. There are three British species of *Drósera*: *D. rotundifòlia* having spreading orbicular leaves with hairy petioles, and *D. Ánglica* and *D. intermèdia* having oblong-spathulate sub-erect leaves with glabrous petioles; the latter is known by its flower-scapes being curved at the base.

Order XLII.—HAMAMÉLIDEÆ.

This is a somewhat anomalous group of shrubs and trees. Leaves usually stipulate and alternate, simple, entire, toothed or lobed. Flowers often small and unisexual, usually in dense heads. Fruit a woody capsule, 2-celled, 2- or many-seeded. About fifteen genera, and as many more species, are referred here.

1. FOTHERGÎLLA.

A genus of one North American species, occasionally seen in our gardens. Flowers white, in dense terminal bracteate spikes. Petals none. Stamens about 24; filaments long, clavate. Capsule 2-seeded. Named after Dr. Fothergill.

1. *F. alnifòlia.*—A dwarf straggling shrub with slender crooked branches. Leaves deciduous, obliquely ovate, pubescent beneath, irregularly crenate, or lobed above the middle. Flowers fragrant, produced in May before the leaves.

2. LIQUIDÁMBAR.

Trees with a balsamic juice. Leaves alternate, glabrous, deciduous, palmately lobed; petioles long and slender. Male and female flowers separate, with four large bracts forming an involucre at the base of each head. Petals none. Capsules woody, several together, splitting between the cells. Seeds several, angular, shortly winged. There are only three species known, one from the Levant, one North American, and one lately discovered in the island of Formosa. The name was given in consequence of one species producing the liquid storax.

1. *L. Styracíflua.*—This is a small erect-growing tree of elegant appearance, especially towards Autumn, when the leaves change to a bright red, and remain on the tree for some time afterwards. In foliage it resembles some of the Maples, but the leaves being alternate it is readily distinguished. North America.

2. *L. imbérbe*, syn *L. orientàlis.*—Very near the foregoing, but of a more shrubby habit; the palmate usually 5-lobed leaves are scattered along the branches, not tufted at the extremities, and the main divisions of the leaves are again lobed. A native of the Levant, and rare in British gardens.

Corylópsis spicàta is a handsome deciduous Japanese shrub with Hazel-like leaves and drooping bracteate spikes of yellowish fragrant flowers produced in Spring before the foliage is developed.

Order XLIII.—HALORÀGEÆ.

A small family of marsh and water plants, chiefly insignificant weeds. Flowers small and often incomplete, parts in twos or fours. The Water Milfoil (*Myriophyllum*) and Mare's Tail (*Hippùris*) belong to this order. The only species worthy of further notice here is of very distinct and peculiar habit, as will be seen from the cut.

1. GÛNNERA.

Herbs with large radical leaves. Flowers in dense spikes or branched panicles. About twelve species are known, nearly

all south of the equator, in Africa, America, Australia, and the Antarctic Islands. So named in honour of a Swedish botanist.

1. *G. scàbra* (fig. 102).—This is remarkable for its large Rhubarb-like leaves with prickly petioles, and the large club-



Fig. 102. Gunnera scabra. ($\frac{1}{10}$ nat. size.)

shaped spike of innumerable small flowers of a reddish tinge. A native of Chili, requiring slight protection in severe weather.

Order XLIV.—MYRTÀCEÆ.

This vast order furnishes us with very few hardy subjects; in fact, not a single species that will withstand the climate throughout the kingdom. It includes about seventy-five genera and some 2,000 species, all of which are shrubby or arborescent. They are especially abundant in South America and Australia. The Gum-trees (*Eucalýptus*) of the latter country number nearly 150 species. Some of the slower-growing kinds may prove hardy in this country, but most of them grow so rapidly and make so much wood in one season that it does not ripen, and is cut back by frost. One slow-growing species (*E. pulverulénta*) was formerly represented in Kew Gardens by a specimen about 30 feet high, which must

have weathered several winters. The opposite exstipulate leaves furnished with immersed transparent glands, imbricate calyx-lobes, numerous stamens, and inferior fruit, characterise the great bulk of the order; but Australia produces a distinct tribe or two differing in some particulars.

1. MŸRTUS.

This is the only genus we have to refer to, and one species alone is hardy even in the South-west of England. There are perhaps nearly 100 species belonging to this genus. The name is that applied to the European species by the Greeks.

1. *M. commùnis.* Myrtle.—It is quite unnecessary to describe this charming shrub. Unfortunately it is not hardy enough to bear our winters, except in some parts of the south-western counties. There are a great many varieties from different localities in the South of Europe, varying in the size and form of the leaves, and double or single flowers.

Eugènia Úgni, Myrtilla, is a dwarf branching shrub about as hardy as the Myrtle, with small oval or oblong coriaceous leaves, solitary axillary pink flowers, and red edible berries. Chili.

Order XLV.—MELASTOMÀCEÆ.

Another large assemblage of trees and shrubs, and including a few herbaceous species. Natives of the tropics of all countries, and particularly numerous in America, a few reaching the temperate regions. The members of this order are easily recognised by their opposite exstipulate leaves with parallel nerves, definite stamens, anthers usually opening by pores, and the filaments furnished with an appendage.

1. RHÉXIA.

A small genus of North American plants. Stems shrubby or herbaceous. Flowers tetramerous. Stamens 8, equal. Anthers opening by a terminal pore, spurred at the base. About six species are known. The name is of Greek origin.

1. *R. Virgínica.* Meadow Beauty.—The only species of this large order that is cultivated in the open air in this country, and this is extremely rare, and difficult to grow, requiring a moist sandy bog-earth. It is an herbaceous plant about a

foot high with angular winged stems, sessile lanceolate leaves with bristly teeth, and terminal or axillary clusters of rosy flowers, appearing in June or July.

Order XLVI.—LYTHRÀRIEÆ.

Trees, shrubs, or herbs of variable habit with the branches often tetragonal. Leaves usually opposite, exstipulate. Calyx-lobes valvate. Petals usually crumpled. Stamens definite or rarely numerous. Fruit usually free from the calyx-tube. This order comprises several very curious genera, including the Pomegranate (*Pùnica Granàtum*), referred here by some botanists. It is remarkable for the apple-like fruit having two series of carpels one above the other. Formerly, this was more generally cultivated in boxes or large pots for standing out in the Summer time. The flowers are usually scarlet, but there is a white and also a yellow variety, and also a double flowered form as depicted in the cut (fig. 103).



Fig. 103. Punica Granatum flore pleno. (¼ nat. size.)

1. CÙPHEA.

Herbs, often viscid; branches terete. Leaves opposite or verticillate, ovate or lanceolate, entire. Peduncles from between the petioles, 1- or more flowered. Flowers scarlet, purple, or white. Calyx-tube elongated, ribbed, coloured, produced below in a spur or protuberance with 6 primary teeth, and often 6 secondary smaller ones. Petals 6, small, the 2 upper usually larger, rarely none. Stamens 11, the upper one being deficient; filaments alternately long and short, inserted upon

the throat of the calyx-tube. Capsule free, 2-celled, included in the calyx. There are nearly one hundred species, natives of tropical and sub-tropical America. Name from *κυφός*, curved, referring to the form of the calyx and seed-vessel in some species.

1. *C. ígnea*, syn. *C. platycéntra* of gardens. This is the species commonly grown, having nearly glabrous lanceolate leaves and apetalous bright scarlet flowers with a black and white little-expanded limb. It is a perennial species from Mexico.

C. viscosíssima is a viscid annual with dull purple petals and a green calyx-tube; *C. silenoìdes* with the general appearance of a Silene has purple unequal petals and calyx; *C. strigillòsa* is a perennial with hairy cordate leaves, orange calyx-tube, and 2 small purple petals; *C. Jorullénsis*, syn. *C. éminens*, is a very handsome species with glabrous linear-lanceolate leaves and large apetalous orange and red flowers.

2. LÝTHRUM.

Herbs or undershrubs with 4-angled stems. Leaves opposite or whorled, entire. Flowers in the axil of the upper leaves, cymose or solitary. Calyx-tube costate, straight, equal at the base, 4- to 6-toothed, with an equal number of secondary ones. Petals 4 or 6, large. Stamens 8 to 12, variable in different individuals of the same species. Capsule 1- or 2-celled. About twelve species are found in temperate and tropical regions. The name is adapted from *λύθρον*, gore, from the deep red colour of the flowers.

1. *L. Salicària.* Purple Loosestrife.—One of our most showy native plants, growing in marshy places and on the borders of rivulets. Stems about 3 or 4 feet high, the upper portion clothed with rosy purple flowers. There are improved varieties in cultivation, the best of which is that named *ròseum supérbum.*

Order XLVII.—ONAGRÀRIEÆ.

Annual or perennial herbs or shrubs. Leaves opposite and alternate, usually entire. Flowers often showy, axillary and solitary, or in terminal racemes or panicles. Calyx-tube adnate to the ovary; limb with usually 2 or 4 valvate large lobes.

Petals 2 or 4, rarely more, fugacious, twisted. Stamens 1 to 8. Fruit variable. About twenty genera and 300 species are grouped together under this head. Most of the species are found in temperate regions.

1. EPILÒBIUM.

Calyx-tube slender, scarcely produced above the seed-vessel; limb 4-lobed, deciduous. Petals 4, often 2-lobed. Stamens 8, alternately smaller. Capsule 4-celled, dehiscing between the cells; seeds numerous, with a tuft of silky hairs at the tip. There are upwards of fifty species in the temperate and frigid regions of both hemispheres. The common native species *E. hirsùtum*, popularly known under the name of Codlins-and-Cream, is found by the side of almost every ditch and water-course. It is a coarse growing plant, often 6 or 7 feet high, but its large rosy flowers are very striking and conspicuous towards the end of Summer. The name is derived from ἐπί, upon, λοβός, a pod, in reference to the flower being seated upon the pod.



Fig. 104. Epilobium angustifolium. (¼ nat. size.)

1. *E. angustifòlium* (fig. 104). Rose Bay or French Willow.—The only species worth cultivating. It is a native plant, with bright rosy-purple flowers, produced in Summer. The form usually seen in cultivation differs slightly from the

ordinary wild one in its larger flowers and shorter seed-vessels. There is also a good white variety.

2. ZAUSCHNÈRIA.

A genus of one herbaceous species having the same quaternary structure of the flowers and plumose seeds as *Epilòbium*, but the calyx is coloured, and the tube prolonged above the ovary. A commemorative name.

1. *Z. Califórnica.*—A much-branched dwarf plant bearing sessile linear-lanceolate pubescent leaves and axillary solitary sessile scarlet flowers with a long slender projecting style, resembling those of a *Fùchsia*. It is a native of California, flowering in June.

3. CLÁRKIA.

Elegant slender branching annual plants with linear or lanceolate leaves and solitary or racemose flowers. Parts of the flower in fours. Petals clawed, often deeply 3-lobed. Capsule linear, many-seeded; seeds neither plumose nor winged. Only four species are known, all from North-west America. Named after Captain Clark, a traveller.



Fig. 105. Clarkia pulchella. (½ nat. size.)

1. *C. pulchélla* (fig. 105). This grows from 18 inches to 2 feet high, with glabrescent linear leaves and large flowers having deeply trilobate petals with a pair of small opposite teeth on the claws. Under cultivation this has given birth to a double variety, and the flowers vary in colour from lilac-purple to white. There is also a variety with entire petals.

2. *C. élegans.*—A rather smaller flowered species. Leaves lanceolate, dentate. Petals entire, without teeth on the claw.

C. gauroìdes, syn. *C. rhomboìdea*, is a less attractive species with smaller purplish flowers.

4. ŒNÓTHERA (including *Godètia*).

Herbs, rarely frutescent. Leaves membranous, sessile or petiolate, entire, lobed, or pinnatifid. Flowers usually large and showy, axillary, sessile, or pedunculate. Calyx-tube produced above the seed-vessel, lobes often reflexed and deciduous. Petals 4, not clawed, entire. Stamens 8. Capsule membranous or woody, costate, clavate, tetragonal, polygonal or winged. Seeds few or many, with or without an appendage. There are nearly 100 species, with the exception of one Tasmanian species, of American origin. The etymology of the name is not satisfactorily explained. *Godètia* was formerly separated on insufficient grounds; but it may be remarked that there are no yellow-flowered species belonging to this section, and in *Œnóthera* they are either yellow or white, with one or two exceptions. The species are very similar in appearance, therefore a small selection will suffice.



Fig. 106. Œnothera rubicunda. (½ nat. size.)

1. *Œ. rubicúnda*, syn. *Godètia rubicúnda* (fig. 106). An erect annual about 2 feet high with lilac-purple flowers having a deeper coloured blotch at the base of each petal. One of the most desirable species. Under cultivation it has produced a beautiful blush-white and other varieties.

2. *Œ. Whítneyi*, syn. *Godètia grandiflòra.*—An annual of recent introduction. This is a magnificent species, of dwarf compact habit, bearing a profusion of rosy-red flowers blotched with crimson, and from 3 to 4 inches in diameter.

Other handsome species of the *Godètia* section are:—*Œ.ròseo-álba*, rosy purple and white, *Œ. Lindleyàna*, purple, also with double flowers, and *Œ. réptans*, a trailing species with rose-purple spotted flowers.

3. *Œ. biénnis.* Evening Primrose.—This is the species first

introduced, and now become naturalised in some localities. It is a tall pubescent plant with yellow flowers about 3 inches in diameter. The peculiarity of this and some other species is, that the flowers do not expand till towards evening.



Fig. 107. Œnothera speciosa. (⅛ nat. size.)

4. *Œ. Fràseri.*—This is one of the best yellow-flowering perennial species. It has rich dark-green foliage, and blossoms abundantly throughout the Summer.

5. *Œ. taraxacifòlia.*—A dwarf perennial with pinnatifid leaves and large pure white flowers.

Œ. acaùlis and *Œ. speciòsa* (fig. 107) are dwarf perennial white-flowered species; *Œ. chrysántha* and *Œ. Missouriénsis* have yellow flowers, and the latter is of prostrate habit, and one of the most desirable. Amongst annuals may be cited *Œ. macránthu* and *Œ. odoràta*, both yellow.

5. EUCHARÍDIUM.

Pretty annual herbs of dwarf habit, remarkable for the slender calyx-tube, which is elongated far above the seed-vessel. Calyx-limb deciduous. Petals 4, clawed, 3-lobed or obcordate. Stamens 4. Capsule 4-celled, dehiscing through the cells; seeds numerous. There are only two species, both natives of California. Name from *εὔχαρις*, agreeable.

1. *E. concínnum.*—A graceful little plant about a foot high. Leaves glabrous, ovate-lanceolate, entire. Calyx-lobes cohering at the tips, reflexed. Petals trilobate, lilac-purple.

E. grandiflòrum of gardens appears to be merely a large-flowered variety of the foregoing.

6. FŪCHSIA.

Small shrubs or trees with opposite or whorled leaves. Calyx coloured, tube produced above the ovary, limb 4-lobed. Petals sessile on the mouth of the calyx-tube. Stamens 8, on

slender filaments. Style long and slender. Fruit a pulpy berry. The species are estimated at about fifty, with the exception of two from New Zealand, all natives of America. Named after Fuchs, a German botanist. Almost any of the species and varieties will flourish in the open air during the Summer months, and some of them will withstand our winters without protection if treated as herbaceous plants, while one or two succeed well trained against a wall, in the more favoured localities. *F. fúlgens* (fig. 108) is one of the tenderer species



Fig. 108. Fuchsia fulgens. (⅓ nat. size.)

belonging to a distinct section, having a very long calyx-tube and short sepals.

The following are some of the hardier species or varieties:—*F. globòsa* (fig. 109).—This variety is readily known by the globular form assumed by the incurved sepals, and is probably a variety of *F. macrostèma*, syn. *F. Magellánica*. Indeed, it is very probable that all or nearly all of the hardier varieties are forms of that species, which is a native of the extreme South of America. The variety called *coccínea* in gardens it has lately been discovered has no title to that name, but belongs to this group. The true *coccínea*, sometimes called *grácilis*, has nearly sessile leaves and other differences, and is now very rare in British gardens. Its native country is probably Brazil. *F. Riccartòni* is perhaps the hardiest of all the

varieties, and one of the most profuse bloomers. In the south and west it attains a large size against a wall, and is sufficiently



Fig. 109. Fuchsia globosa. (½ nat. size.)

hardy to withstand our Winter in such a position. This has red straight sepals and a purple corolla. *F. cónica, díscolor,* etc., are near allies.

7. LOPÈZIA.

Curious herbs with rather small flowers, remarkable in having only one antheriferous stamen, and one petaloid. *L. coronàta* is an interesting annual about 2 feet high, with alternate ovate-lanceolate serrate petiolate leaves and rose-purple flowers. The petals are reflexed, and are deeper coloured towards the base. There are six species reported from Central America.

8. GAÛRA.

Annual or perennial herbs, rarely shrubby. Leaves alternate, simple, entire, dentate or sinuate. Flowers sessile or pedicellate, in racemose spikes. Sepals and petals 3 or 4. Stamens 6 or 8, declinate; filaments slender, with a scale-like appendage at the base. Fruit indehiscent, 3- or 4-celled, or 1-celled

from the disappearance of the septa; cells 1-seeded. There are about a dozen species, from the warmer parts of North America. The name is derived from γαῦρος, elevated, probably from the petals being directed upwards.

1. *G. Lindheimèri* (fig. 110).—This is the only species in general cultivation. It is a branching slender herbaceous species, bearing its long spikes of white and pink flowers in great abundance throughout the Summer.



Fig. 110. Gaura Lindheimeri. (¼ nat. size.)

Order XLVIII.—LOÀSEÆ.

Erect or climbing herbs, destitute of tendrils, or more rarely shrubs, frequently clothed with hispid often stinging hairs. Leaves opposite or alternate, entire, lobed, pinnatifid or pinnate; stipules none. Flowers regular, hermaphrodite, solitary, racemose, or cymose or capitate; peduncles often opposite the leaves; pedicels bibracteolate. Calyx-tube adnate to the ovary, often ribbed and twisted; limb of 4 or 5 imbricated or contorted persistent lobes. Petals 4 or 5, inserted upon the throat of the calyx, sessile or clawed, flat or hooded. Stamens usually numerous, often in bundles opposite the petals, occasionally with intervening filiform or petaloid staminodes. Capsule commonly 1-celled, with straight or twisted ribs; seeds 1 or more, usually minute. Ten genera, containing about one hundred species, belong to this order, and, with the exception of one monotypic genus from tropical Africa, all are American.

1. MENTZÈLIA.

(Including *Bartònia* and *Eucnide*.)

Herbs with alternate leaves. Flowers large, white or yellow. Stamens very numerous. Petals flat. Capsule 1-celled, straight;

seeds few or many. Named in honour of G. Mentzel, a German botanist.

1. *M. aùrea* (fig. 111), syn. *Bartònia aùrea.*—A very handsome Californian annual, better known under the latter name. It grows about 2 feet high, with whitish branches, hispid leaves, and bright yellow flowers.



Fig. 111. Mentzelia aurea. (½ nat. size.)

2. *M. bartonioìdes*, syn. *Eucnìde* and *Microspérma.*—Very near the preceding, but with smaller yellow flowers.

2. LOÀSA.

(Including *Caiophòra.*)

Erect climbing or prostrate herbs with hispid stinging hairs. Leaves alternate or opposite, simple or compound. Petals 5, hooded, spreading or erect, connivent, alternating with the same number of scales, having 2 or 3 bristles on the back, and an appendage at the base. Stamens in phalanges opposite the petals, staminodes filiform, two opposite each scale. Capsule 1-celled, 3- to 5-valved, rarely twisted; seeds numerous. There are about fifty species, all South American. Named in honour of a Spanish botanist.

1. *L. aurantìaca*, syn. *Caiophòra laterìtia.*—A perennial of climbing habit with elegantly lobed leaves and orange and brick-red solitary flowers of very curious structure. The only objection to this and allied species is the presence of stinging hairs on all parts of the plant, which are equally painful with those of the common Nettle. A native of Chili, usually treated as an annual.

L. acanthifòlia, syn. *L. Plàcei*, has yellow and red flowers

and handsome foliage ; *L. pícta*, yellow and white ; *L. trícolor*, yellow and red ; and *L. Pentlándica*, white tipped with orange.

Blumenbáchia insígnis.—An allied plant in which the capsule splits to the base into 10 valves. Leaves opposite, pinnatifid. Flowers axillary, on long peduncles, pure white, about an inch in diameter.

Order XLIX.—PASSIFLÒREÆ.

The plants of this family are mostly of climbing habit, with alternate lobed leaves and lateral tendrils. In structure they are remarkable in having a single double or triple corona, as



Fig. 112. Passiflora cærulea. (¼ nat. size.)

the organs are collectively termed which intervene between the petals and stamens. The fruit is superior, often fleshy, edible

and indehiscent, and usually stipitate. About 250 species and 20 genera are comprised in this order. They are usually very showy, but unfortunately nearly all are natives of the tropics.

1. PASSIFLÒRA.

Distinguished from the neighbouring genera by the short calyx-tube and the three often recurved styles. Passion-flower is simply a translation of the technical name, which was given on account of a fancied resemblance in the parts of the flower to the instruments of Christ's suffering.

1. *P. cærùlea* (fig. 112).—The only hardy species, and even this requires the protection of a wall and covering in very severe weather. The petals vary in colour from white to pale blue and rosy-red, and the fringed corona and centre of the flower is differently coloured in different varieties. It frequently ripens its fruit in this country. This is about the size and shape of a small hen's egg, changing from green to orange, and ultimately scarlet. The flowers are produced very freely, especially in the neighbourhood of the sea. It is a native of Brazil.

Order L.—CUCURBITÀCEÆ.

Scandent or prostrate herbs, annual, or often with a large fleshy perennial rhizome, rarely shrubby. Leaves alternate, simple, lobed, or palmately or pedately partite. Tendrils (when present) lateral, solitary, simple or branched. Flowers monœcious or diœcious, white or yellow, rarely blue or red. Petals variable, often confluent with the calyx. Stamens commonly 3; anthers extrorse, often sinuate. Fruit inferior, usually fleshy, often large, very variable in form, sometimes brilliantly coloured; seeds variable, destitute of albumen. The plants belonging to this order are mainly from tropical regions, especially the more ornamental ones. Of the 500 species known, a few are notable for their ornamental fruits, and some, like the Melon and Cucumber, are valuable for food. We have one native species, the Red Bryony, *Bryònia dioïca*. It has annual climbing stems, which are produced from a large tuberous root or rhizome. Its elegantly lobed leaves and red berries are familiar in the south. *Cucúrbita Pèpo* furnishes some of the handsomest of the annual ornamental gourds. In the form and colour of the fruit it is one of the most variable plants in culti-

vation. Amongst the more striking are: *aurantiifòrmis*, Orange Gourd, in colour and shape exactly resembling an orange; *limònis*, Lemon Gourd; *malifòrmis*, Apple Gourd; and *pyrifòrmis*, Pear Gourd; besides innumerable other distinct intermediate and small-fruited varieties. *Lagenària vulgàris* includes those popularly known as Trumpet, Hercules' Club, Plate de Corse, Siphon, and Bottle Gourds. *Cùcumis erinàceus* and *C. myriocárpus* are respectively the Hedgehog Cucumber and Gooseberry Gourd. *Trichosánthes colubrìna* is the Snake Gourd. The names are sufficiently descriptive of most of those above enumerated, especially as many of them are not distinguishable except by their fruits. The native countries of most of the edible species cannot be given with any degree of certainty. Of hardy perennial species we may cite *Abòbra viridiflòra*, a native of Uruguay, with annual stems, finely-cut leaves, and greenish-white stellate flowers succeeded by small bright scarlet berries; and *Thladiántha dùbia*, with cordate hirsute leaves, an abundance of medium sized yellow flowers, and bright red fruits about the size and form of a hen's egg. Both of the foregoing are diœcious.

Order LI.—BEGONIÀCEÆ.

This order comprises one vast genus, *Begònia*, containing upwards of 350 species, and one or two monotypic genera. The species are mostly succulent herbs of variable habit and duration, and many have perennial tuberous rhizomes. Leaves alternate, simple, variously lobed or entire. Flowers often very showy, white, rose, scarlet or yellow, unisexual and unsymmetrical. Segments of the perianth 2 or more, all petaloid. Stamens many; filaments free or connate. Fruit capsular or baccate, often angular and 3-winged. Seeds numerous, very minute. Nearly all the species are tropical, but one or two from the Andes have recently been introduced and distributed as hardy plants, and one Chinese species needs only slight protection. Many others may be planted out in Summer in sheltered situations.

1. *B. Evansiàna*, syn. *B. díscolor*.—This is a very free-flowering large-leaved caulescent species from China. The leaves unequally cordate, sharply toothed, hispid above, and

bright red on the veins beneath. Flowers in terminal panicles, rosy-pink.

2. *B. Veitchii.*—A very fine species, found at an elevation of 12,000 feet in Peru. Stemless, with thick fleshy oblique cordate lobed leaves and very large vermilion-coloured flowers, about two on each scape, with rose-coloured bracts.

Order LII.—CÁCTEÆ

A highly curious assemblage of plants, in nearly all of which the leaves are undeveloped or reduced to spines or scales, and the stems fleshy, abounding in the most remarkable and ungainly forms. The flowers are often large and brilliant, the calyx-lobes as well as the petals being coloured, and the stamens numerous. Style long, often terminated by a radiating multipartite stigma. Fruit inferior, baccate; seeds numerous, on parietal placentas. With the exception of the genus *Rhipsalis*, all are natives of America, from Chili to Canada in 50° north latitude, but chiefly from Mexico. A few species are hardy in dry situations or on rockwork.

Opúntia Rafinesquiàna, *O. vulgàris*, and two or three species of *Mammillària* are amongst the hardiest, but they are rarely cultivated, except by curious amateurs.

Order LIII.—FICÒIDEÆ.

This order includes about a score of uninteresting genera besides the following, which is the only one we have to consider.

1. MESEMBRYÁNTHEMUM.

Herbs or erect or prostrate shrubs with usually opposite simple fleshy leaves very variable in form, and conspicuous white, yellow or red flowers resembling some of the *Compósitæ* in appearance, though widely different in structure. Calyx-tube adnate to the ovary, limb 5- to 8-lobed. Petals linear, numerous, in one or more series. Stamens numerous. Capsule contained in the fleshy calyx-tube, usually 5-celled, opening through the top of the cells, many-seeded. The species are estimated at about 300, the majority inhabiting South Africa. The name is a compound of *μεσημβρία*, mid-day, and *ἄνθεμον*, a flower; the flowers of many species do not expand except when the sun shines upon them.

1. *M. crystallìnum.* Ice Plant.—This very remarkable plant is a native of the South of Europe. It is a dwarf branching annual with alternate or opposite oblong-undulate sessile leaves which as well as the stem are covered with crystalline granules. The flowers are solitary and axillary, either pink or white, with a yellow centre.

2. *M. cordifòlium.*—This is a perennial species, and better known by the variegated form, which is in great request for bedding in Summer. The habit is dwarf and dense, with small cordate leaves and sessile purple flowers. South Africa.

3. *M. trícolor.*—A pretty tender annual species, growing in dense tufts. Leaves long, linear, acute. Flowers pink and crimson with a dark eye, solitary, on long radical peduncles covered with small granular protuberances. South Africa.

Order LIV.—UMBELLÍFERÆ.

Herbs or shrubs, rarely arborescent. Leaves usually much divided. Flowers very small, in compound or simple umbels, rarely capitate, with or without involucral bracts. Calyx superior, limb obsolete or 5-toothed. Petals 5, epigynous, the tips usually incurved. Stamens 5. Fruit of two indehiscent 1-seeded dorsally or laterally compressed carpels with longitudinal oil canals; seeds albuminous. This very numerous order offers little in the floral department, but a few are grown for their ornamental foliage or bracts. It furnishes us with many valuable esculents and aromatic spices and a few drugs, such as Carrot, Parsnip, Samphire, Anise, Caraway, Cummin, and Asafœtida. And there are some virulently poisonous, as *Conìum*, *Cicùta*, and *Œnánthe*. There are 152 genera and about 1,300 species, chiefly from temperate regions.

1. BUPLEÛRUM.

Leaves simple and entire. Flowers yellowish, in compound umbels. Calyx-teeth none. Fruits laterally compressed. About sixty species of this genus are known, chiefly from the north temperate zone, a few reaching South Africa. The etymology of the name is uncertain. Most of the species are herbaceous or annual, but the only one that concerns us is shrubby.

1. *B. fruticòsum.*—A small branching shrub with alternate

coriaceous obovate-lanceolate mucronate glabrous leaves glaucous beneath, and terminal compound umbels of yellowish flowers with entire involucral bracts. The only shrubby species of the family in general cultivation, and this is not very hardy, and more curious than beautiful. South Europe.

2. ERŸNGIUM.

Herbs with prickly foliage and bracts. Leaves lobed or dissected or undivided, with rigid teeth. Flowers sessile, in dense heads or spikes surrounded by a whorl of bracts. About 100 species, from the temperate and warmer regions, absent only from South Africa. Two or three species are cultivated on account of the bright blue colour of the involucral bracts, which are of long duration. The name is of classical origin, but its application is uncertain. The Sea Holly, *E. maritimum*, belongs to this genus.

1. *E. alpìnum.*—A dwarf perennial about 18 inches or 2 feet high. Radical leaves on long petioles, undivided, deeply-cordate; cauline sessile, 3- or 5-lobed, with sharp teeth. Involucre multifid, with spinose teeth, ultimately assuming a deep blue tint. Flower-head oblong. Switzerland.

2. *E. Bourgàti.*—Similar to the last, but with the radical leaves triternately deeply divided, lobes terminating in long slender sharp teeth, and the flower-head globose. A very pretty glaucous green species, the involucres and stems at length blue. It comes from the South of France.

3. *E. amethystìnum.*—About 3 feet high. Leaves about a foot long, bipinnatifid; segments few, long, and narrow, with spinose teeth. A more branching plant than either of the foregoing. Involucres and upper branches blue. A native of the Tyrol, etc.

3. ASTRÁNTIA.

Erect perennial herbs with palmately-lobed leaves, not spiny. Umbels simple or compound, exceeded by the radiating coloured involucral bracts. A genus of a few variable species, which have received a great many names, and consequently there is much confusion in the nomenclature. Natives of Europe and Western Asia. Name from ἄστρον, a star, in allusion to the umbels.

1. *A. màjor.* Masterwort.—A branching herb about 2 feet high. Leaves on long petioles, with 3 to 7 lanceolate serrate

lobes. Bracts and flowers pink or white. Central and Southern Europe, and occasionally as a garden outcast in this country. There are several varieties of this, some more highly coloured than others, and the best are worthy of a place in every garden.

4. TRACHYMÈNE (*Didiscus*).

This is an Australasian genus of few species, with the flowers in simple umbels, and the fruit very much flattened laterally. From τραχύς, rough, and ὑμήν, a membrane or skin.

1. *T. cærùlea*, better known as *Didiscus cærùleus*.—This is the only familiar ornamental annual species of this family. It grows from 1 to 2 feet high. Leaves triternately divided into linear segments. Flowers bright blue. Fruit tubercular.

5. FÉRULA.

Gigantic herbs with large much-divided leaves and tall branched inflorescence. Umbels compound; fruit dorsally compressed, almost flat, laterally winged. Natives of the Mediterranean region and Central Asia. The classical name.

1. *F. commùnis* (fig. 113). Giant Fennel.—This is ex-



Fig. 113. Ferula communis.

tremely effective in single specimens in a large garden, growing to a height of 10 or even 15 feet. A native of the Mediterranean region. There are several other species with handsome foliage, as *F. Tingitàna*, *F. glaùca*, etc.

6. HERÁCLEUM.

Allied to the last genus, but differing in the structure of its fruit. Also large plants with ornamental foliage. There are about fifty species, nearly all in the north temperate zone. *H. Sphondýlium* is the Common Hogweed or Cow Parsnip. Named after *Hercules*.

1. *H. flavéscens*, syn. *H. Austrìacum* (fig. 114).—This species has the foliage more deeply cut than in the native



Fig. 114. Heracleum flavescens.

species. Besides this there are several species or varieties in cultivation, but there is much confusion amongst the names: *H. éminens*, *gigánteum*, *Pérsicum*, *ásperum*, and *Pænàces* amongst others. They grow from 6 to 12 feet high, and bear truly enormous umbels containing thousands of flowers, and are very striking objects.

Other members of this order, noteworthy for their ornamental foliage, are: *Archangélica atropurpùrea*, *Molopospérmum cicutàrium*, *Nárthex Asafœtida*, *Smýrnium* spp., *Silàus* spp., *Méum athamánticum*, etc.

Order LV.—ARALIÀCEÆ.

Erect or climbing shrubs or trees, very rarely herbaceous, often clothed with a stellate pubescence, occasionally armed with spines. Leaves alternate, or very rarely opposite, entire, toothed, lobed, or palmately or pinnately divided; stipules various, rarely none. Flowers hermaphrodite or unisexual, regular, usually small, capitate, umbellate, racemose or paniculate. Calyx-tube adnate to the ovary; limb small. Petals 3 or more, often 5, usually valvate. Stamens of the same number, rarely more. Fruit inferior, drupaceous or baccate, 1- or more celled; cells 1-seeded. Very near the *Umbelliferæ* in structure. The species are estimated at about 350, distributed into 35 genera. They are chiefly from tropical countries, but there are a few hardy species familiar in our gardens.

1. ARÀLIA.

Perennial herbs or deciduous shrubs, often spiny. Leaves digitate, or once or more pinnate; leaflets serrulate. Flowers in umbellate racemes or panicles, rarely in compound umbels. Petals 5, imbricate. Fruit laterally compressed, 2- to 5-celled. Pedicels articulated with the flowers. About thirty species are referred here, nearly all from the northern hemisphere and a few from temperate North America and Asia. The origin of the name is unexplained.

1. *A. spinòsa.* Angelica Tree.—This is, after the Ivies, the most familiar species of the order. It is a shrub or small tree with simple stout stems and very large tripinnate leaves composed of numerous serrulate leaflets. The stem and petioles are usually spiny. Inflorescence terminal. A handsome and distinct shrub from North America.

2. *A. Chinénsis*, syn. *A. Mandshùrica*, *Dimorphánthus.*—Near No. 1, but with very hairy and prickly usually bipinnate leaves and less regularly toothed leaflets. A native of North China, etc.

A. nudicaùlis, *racemòsa*, *híspida*, and *Gínseng*, syn. *Pànax Gínseng*, are North American herbaceous species, possessing

medicinal properties, but of no special merit as ornamental plants.

2. FÁTSIA.

Spinescent or unarmed small trees or shrubs with large palmately-lobed leaves. Flowers in umbellate racemes or panicles. Petals valvate. Fruit compressed laterally. Only three species are included here, two of which are occasionally grown.

1. *F. Japónica*, syn. *Aràlia Sieböldii*, *A. papyrífera*. Rice Paper Tree.—A very handsome and distinct small but rather tender tree with large palmate deciduous leaves densely covered with a stellate pubescence. A native of Formosa.

2. *F. hórrida*, syn. *Pànax hórridum*.—A very spiny thick-stemmed shrub with palmately-lobed cordate petiolate prickly leaves and terminal inflorescence. A native of North America.

Eleutherocóccus senticòsus is a recently introduced prickly shrub from North-eastern Asia. It has palmately divided deciduous leaves on very long petioles, and small dicœcious umbellate flowers; male lilac and female yellow. It is reported to be quite hardy.

3. HÉDERA.

Climbing evergreen shrubs with simple leaves. Flower-umbels paniculate. Petals valvate, with an equal number of stamens. Seeds with ruminated albumen. The derivation of the name is obscure, but supposed to be from the Celtic *hedra*, a cord, in allusion to the stems. There is an Australian species with pinnate leaves, and all the other forms are referred to one species by some botanists, and by others they are grouped under several different names. The extreme varieties are very distinct and readily recognised, but there are some intermediate forms which are not so easily disposed of. The Ivies are found throughout the north temperate and warm regions of the Old World, and some of the forms are local, which has led to their receiving names indicative of the countries they inhabit, whilst others have been less appropriately named. Without committing ourselves on the species question, we will enumerate a few of the most distinct forms. It should be remembered that the leaves on young plants and on flowering branches are often very different from the bulk. Ivies rarely flower in the creeping form, or when climbing until they have reached the summit

of the support, where they assume a different closer stouter growth and produce flowers.

1. *H. Hèlix.* Common Ivy.—The varieties of this are numerous and handsome. Flowering specimens, it is said, may be distinguished by the pedicels and calyx being clothed with 6- to 8-rayed stellate hairs. But the names are almost sufficiently descriptive of the peculiarities of the garden forms, as: *pedàta, palmàta, rugòsa, lùcida, sagittæfòlia, mìnor marmoràta, aùrea marginàta, argéntea marginàta,* etc. There are also green and variegated arborescent forms, and others with white, yellow, or black berries.

2. *H. Canariénsis,* or *Hibérnica.* Usually known in gardens as the Irish Ivy.—Stellate hairs of the inflorescence with 13 to 15 rays. *Algeriénsis* is one of the best green-leaved varieties referred here. Though the variegations are not so numerous and varied, there are some very desirable, generally of more robust and vigorous growth than in No. 1: *pállida, maculàta, argénteo-marginàta, Cavendishii,* etc.; *arboréscens* and *cordifólia* are 'Tree Ivies.'

3. *H. Rægneriàna* or *Cólchica.* Giant Ivy.—Inflorescence furnished with 2-lobed scales, each lobe again divided into 7 to 10 teeth. The leaves of this form are very large, thick and leathery. There is a variety, *arbòrea,* both green and variegated.

Order LVI.—CORNÀCEÆ.

Shrubs, trees, or herbs. Leaves simple, alternate or opposite, deciduous or evergreen, exstipulate. Flowers usually small and inconspicuous, in terminal cymes or panicles, or amentaceous or capitate with a coloured involucre. Calyx-tube adherent to the ovary. Petals none, or 4 or 5, rarely more. Stamens 4 or 5. Fruit drupaceous, 1- to 4-celled, or with 1 to 4 1-seeded stones. A small order of about seventy-five species, widely scattered throughout the world, but most abundant in the temperate regions of the north.

1. CÓRNUS (including *Benthámia*).

Shrubs, small trees, or herbs with usually opposite leaves and hermaphrodite tetramerous flowers with or without an involucre and a 2-celled fruit. There are about twenty-five

species in Europe, Asia, and North America. The name is from *cornu*, a horn, from the hardness of the wood, or perhaps the hard stone of the fruit. We have two indigenous species: *C. sanguínea*, Dogwood, a shrub with red bark, ovate opposite leaves, and terminal cymes of white flowers without bracts and small black berries; and *C. Suècica*, an herbaceous plant about 6 inches high with terminal umbels of flowers supported by four white bracts. The former is commoner in the southern, and the latter confined to the northern part of the kingdom.

1. *C. mas.* Cornelian Cherry.—A small tree, native of Europe, producing its little clusters of yellow flowers in Spring before the leaves. The flowers are surrounded by an involucre of four yellowish bracts. Leaves ovate-acuminate. Berry red. There is a handsome variety with variegated foliage which bears fruit abundantly.

2. *C. álba.*—A shrub with deep red bark, obovate oblong acuminate leaves, and white flowers followed by white berries. A native of Siberia.

3. *C. flórida.*—A very ornamental little tree with ovate oblong or obovate leaves pubescent beneath. Flowers large, white, with a very large and conspicuous white involucre. Berry scarlet. North America.

4. *C. fragífera*, syn. *Benthámia fragífera.*—An evergreen shrub with lanceolate leaves and terminal capitate small green flowers; involucre of four large yellowish bracts. In this species the berries grow together, forming a large strawberry-like scarlet fruit. A native of Nepal, and rather tender.

5. *C. Canadénsis.*—An herbaceous species closely resembling the native one, but the upper leaves are much larger, and the flower-head more conspicuous.

2. AŪCUBA.

Evergreen shrubs with opposite leaves, diœcious tetramerous small purplish paniculate flowers, and 1-celled 1-seeded drupaceous fruits. The Japanese name.

1. *A. Himalàica.*—This is very near, and perhaps only a variety of the following species, differing mainly in the longer petioles and distant blunt tumid teeth of the leaves, and in having spherical (not oblong) berries. The foliage is ample and effective. We are not aware that there are any variegated forms of this. The male only is in cultivation.

2. *A. Japónica*, var. *maculàta.*—The mottled leaves of this

variety have long formed one of the most familiar objects in cultivation; but the scarlet berries are still comparatively rare, in consequence of the absence until recently of male plants. The normal green-leaved form has also been introduced; and there are already nearly a score of different varieties offered by nurserymen, differing in the form or variegation of the leaf. The following are some of the new varieties. Male varieties: *pícta*, *bìcolor*, *sulphùrea*, and *ovàta*, with variegated foliage; and *vèra* and *grándis*, with green foliage. Female varieties: *sulphùrea*, *aùrea marginàta*, and *latimaculàta*, with variegated leaves; and *longifòlia*, *luteocárpa*, *vèra*, and *angustifòlia*, with green leaves.

3. GÁRRYA.

Evergreen shrubs with opposite leaves and diœcious flowers in catkins. Petals none. Calyx-lobes and stamens 4. Berry 1-celled, 1- or 2-seeded. There are eight species known, one West Indian, and the remainder from California and Mexico. Named after Mr. Garry, of the Hudson's Bay Company.

1. *G. ellíptica.*—A handsome shrub with dark green coriaceous leaves, and catkins of yellowish flowers in clusters near the tips of the branches. The male plant only is in cultivation, in which the catkins are pendulous, silky, and furnished with connate bracts. The flowers are produced from November till February. A native of California.

Griselínia littoràlis and *G. lùcida*, are allied diœcious tender shrubs or small trees from New Zealand, with handsome coriaceous glossy oblique alternate persistent leaves; the former being indistinctly and the latter prominently veined beneath.

The genus *Nýssa* comprises about half-a-dozen arborescent species, with polygamous small capitate flowers, 1-celled 1-seeded drupes, and simple alternate deciduous leaves. One or two of the North American species are met with here and there, but they are very rare. *N. multiflòra*, syn. *N. aquática*, *villòsa*, etc., and *N. uniflòra*, syn. *N. denticulàta*, *tomentòsa*, etc., are the principal species. They are both handsome trees. The female flowers are solitary in the latter, and the fruit oblong and blue, whereas in the former the female flowers are clustered and the fruit ovoid. There are several popular names applied to them, as Tupelo, Pepperidge, Sour Gum Tree, etc.

Division II. —*GAMOPÉTALÆ.*

Petals usually united, forming a monopetalous corolla.

Order LVII.—CAPRIFOLIÀCEÆ.

Shrubs or herbs with opposite usually exstipulate simple or compound leaves and usually corymbose or cymose flowers. Calyx-limb superior, 3- to 5-toothed or -lobed. Corolla regular or irregular, often 2-lipped. Stamens 4 to 10, inserted upon the corolla. Fruit a berry, drupe, or dry capsule, indehiscent, 1- or more celled and seeded; seeds albuminous, often with a horny testa. There are about 200 species, in 14 genera, chiefly from the temperate parts of the northern hemisphere.

1. LINNÆA.

A genus of one species. A small elegant creeping evergreen shrub, named in honour of the celebrated Swedish botanist, and thus possessing an additional attraction in the eyes of the amateur.

1. *L. boreàlis.* — Leaves ovate, obtuse, crenate, nearly glabrous. Flowers pink, very fragrant, in pairs, on slender bracteolate axillary peduncles. Corolla campanulate. Stamens 4. Fruit small, 3-celled by abortion, 1-seeded. This charming little plant is widely spread in Europe and temperate and arctic Asia and North America, and is indigenous in the North of England and some parts of Scotland, but nowhere very abundant. It flowers in July.

2. LONICÈRA.

Erect prostrate or climbing shrubs with opposite simple entire or lobed deciduous or persistent leaves and cymose or capitate often fragrant flowers sometimes adhering together by the ovaries in pairs. Calyx-limb of five often unequal teeth. Corolla tubular or bell-shaped, gibbous at the base in some species, with the limb oblique or 2-lipped. Stamens 5. Fruit a fleshy 2- or 3-celled berry. There are upwards of eighty species in the temperate and warm regions of the North. This genus was named in honour of the German botanist Lonicer. There is great confusion in the nomenclature of the Japanese and Chinese Honeysuckles, arising probably from the fact that many of them are garden varieties.

1. *L. Periclýmenum.* Honeysuckle or Woodbine.—This favourite indigenous shrub is surpassed by none of the exotic

species in the profusion and fragrance of its flowers, but for brilliancy of colouring there are many superior. Flower-heads terminal, peduncled; upper leaves sessile; berry crimson. There are several improved varieties, including the Dutch, *L. Bélgica*, the Oak-leaved, *L. quercifòlia*, and Late Red, *L. serótina*, and one with variegated foliage of little merit.

2. *L. Caprifòlium* (fig. 115), syn. *Caprifòlium Itálicum.*— This species strongly resembles the preceding in the colour of its flowers, but the flower-head is sessile and the upper leaves connate. A native of the South of Europe.

3. *L. Etrúsca.* — Flowers orange-yellow, capitate; heads pedunculate. Upper leaves connate, young ones hairy



Fig. 115. Lonicera Caprifolium. (½ nat. size.)



Fig. 116. Lonicera sempervirens. (½ nat. size.)

beneath. A native of the South of Europe, flowering in May, though not so freely as some.

4. *L. sempervìrens* (fig. 116). Evergreen or Trumpet Honeysuckle.—This in its different varieties is one of the handsomest species in cultivation, bearing its scarlet inodorous flowers in great profusion for a considerable period in Summer. The leaves are quite glabrous, oblong or rotundate, glaucous beneath, and persistent during the greater part of the Winter. The variety named *Brównii*, in which the flowers are of a brighter hue, is one of the best. It is a native of North America.

L. coccínea and *L. pubéscens* are allied species from the same country.

5. *L. brachypòda.* — One of the best evergreen species. Leaves oval or oblong, glabrous and shining, with short hairy petioles. Flowers medium size, in pairs, pale yellow, and very sweet-scented. There is a handsome and very desirable variety, named *aùreo-reticulàta*, in which the foliage is beautifully netted or variegated with yellow, with a mixture of red towards Autumn. This is undoubtedly one of the most elegant variegated plants in cultivation, and like many others of its class a native of Japan. *L. Japónica*, or *L. Chinénsis*, is a form of this species with more or less hairy leaves.

6. *L. flexuòsa.*—Stems and young leaves hairy. Leaves ovate-lanceolate, purplish below when young. Flowers pink and yellow, in pairs, very fragrant. Japan.

7. *L. Xylósteum.*—An erect species with small ovate or obovate hairy leaves and hairy yellow small flowers in axillary pairs. There are varieties with white, yellow, crimson, and black berries. A native of Europe, introduced in some parts of this country. *L. Tatárica* is an allied species with rosy-pink flowers in the common form and yellow or white in the varieties.

8. *L. fragrantíssima.*—This species is desirable as an early-flowering plant. It puts forth its pure white highly odoriferous flowers in February before the leaves are developed. *L. Stándishii*, very near the preceding, has purple and white scented flowers. Both are natives of China.

3. ABÈLIA.

A small genus of deciduous or evergreen shrubs with slender branches, opposite leaves, and terminal or axillary clusters of handsome flowers. Calyx-lobes foliaceous or linear. Corolla funnel-shaped. Stamens 4, equal or didynamous. Ovary 3-

celled, many-ovuled. Fruit a coriaceous 1-seeded berry. Natives of Asia and Mexico, and rather tender. Named after Dr. Abel, who visited China with Lord Amherst.

1. *A. triflòra.*—A small branching shrub with nearly sessile lanceolate entire ciliate small leaves and small pale yellow flowers tinged with pink and arranged in threes at the extremities of the branches. The calyx-lobes are long and linear, clothed with long hairs, and persistent after the corollas have fallen. North India.

2. *A. floribúnda.*—A handsome Mexican species. Leaves glabrous, ovate, obtuse, crenate. Flowers rosy-purple, about 2 inches long, in axillary clusters. This requires protection in ordinary winters.

3. *A. rupéstris.* — A deciduous branching hairy shrub. Leaves small, ovate, remotely serrate. Flowers small, pink, in twos, on short peduncles at the ends of the branches. The calyx-lobes are foliaceous and of a reddish tinge. A native of China.

4. *A. uniflòra.*—This is by far the handsomest species, having much larger pink and white flowers. The calyx-lobes are foliaceous, and reduced to the number of two. Also from North China.

4. SYMPHORICÁRPUS.

Slender branching deciduous shrubs with small red or white flowers and white or pink berries about the size of a small cherry. There are about half a dozen species, natives of North America. The name is derived from *συμφορέω*, to bear together, and *καρπός*, fruit, in allusion to the clustered berries.

1. *S. racemòsus.* Snowberry.—This is a very common bush in English gardens. It has small oval entire leaves and racemes of small pink flowers, succeeded by the more conspicuous and familiar pure white berries, which are persistent during a greater part of the Winter.

S. occidentàlis (Wolfberry) has rather larger crowded flowers and smaller white fruit; and *S. vulgàris* (Coral-berry) has small dark red berries.

5. LEYCESTÈRIA.

A monotypic genus from Nepal. An erect deciduous shrub with hollow stems, rather large ovate acuminate entire leaves and small white or purplish flowers in pendulous bracteate

racemes from the axils of the upper leaves. Calyx-lobes linear, unequal. Corolla funnel-shaped. Berry many-seeded. A commemorative name.

1. *L. formòsa.*—A very distinct and interesting shrub. The flowers are borne in verticils, gradually diminishing in size towards the tip of the raceme. The berries as well as the foliaceous bracts are of a deep dull purple, and more conspicuous than the flowers.

6. DIERVÍLLA (*Weigèla*).

Handsome shrubs bearing large showy pink, rose, or white flowers in axillary and terminal clusters. Calyx-tube very slender, produced above the ovary. Corolla funnel-shaped or campanulate, nearly regular. Stamens 5. Style single, slender, exserted; stigma capitate. Seed-vessel long and narrow, coriaceous or membranous, many-seeded. The species are natives of Eastern Asia and North America. Named after a botanical author.



Fig. 117. Diervilla rosea. (⅓ nat. size.)

1. *D. ròsea*, syn. *Weigèla rósea* (fig. 117).—A highly ornamental species, and the first of this group introduced. It is of small stature, with ovate-lanceolate serrulate leaves and a profusion of rosy or white flowers in April or May. It is a native of China. There is a variegated and other garden varieties. *D. flórida* is probably a form of this. *D. Japónica* is hardly different from *D. ròsea.*

2. *D. amábilis*, syn. *Weigèla amábilis.*—Very near the last, though of rather larger stature and foliage. The principal difference is in the leaves, which are strongly reticulated, the veins being very prominent on the under side. There are many handsome varieties of this and the foregoing, some of which are probably of hybrid origin. *Isolìnæ* has white flowers with a yellow blotch in the throat; *striàta*, striped red and white; *Van Houttei*, white and rose, very showy; *Stelznéri*,

purplish red, very floriferous. The two latter are usually referred to *D. rósea.*

D. Middendorfiàna has nearly sessile ovate-lanceolate finely reticulated leaves hairy on the nerves, and yellowish white flowers dotted with pink on the lower petal. The latter are arranged in terminal panicles, and are peculiar in having the anthers combined. A native of Siberia. *D. purpuràta* is considered to be a variety of this species.

D. multiflòra, syn. *floribúnda.*—A Japanese species, very distinct in its narrow tubular purplish corollas only slightly expanded towards the mouth. *D. Canadénsis* is an allied species with yellow flowers.

7. VIBÚRNUM.

Shrubs or trees, evergreen or deciduous. Leaves simple, with or without stipules. Flowers small, jointed on the pedicel, in terminal or axillary cymes, corymbs or panicles, pink or white, outer flowers sometimes larger and barren. Calyx-limb minute. Corolla rotate, regular, 5-lobed. Stamens 5. Fruit a 1-seeded dry or fleshy terete or flattened drupe. A considerable genus, abounding in the temperate and warm regions of the north and extending to the Andes of South America. Derivation of the generic name uncertain.

1. *V. Tìnus* (fig. 118). Laurestine or Laurustinus. — This needs no further comment than to mention that there are several varieties in cultivation, differing in the size and hairiness, or in the lighter or darker tint of the foliage. The variegated form is by no means desirable. The ordinary form is perhaps the most free-flowering. The variety *stricta*, with very dark foliage, is perhaps a little hardier than the common one, though neither so graceful nor so free-flowering. It is a native of the South of Europe, and the only evergreen species generally cultivated.



Fig. 118. Viburnum Tinus. (¼ nat. size.)

2. *V. Lantàna.* Wayfaring Tree.—A native shrub or small

tree in South Britain. It grows from 16 to 20 feet high, and is clothed with a scaly or mealy tomentum. Leaves rugose, oblong, cordate at the base, serrulate. Flowers all perfect, white, in large flat cymes, appearing in May or June, succeeded by red eventually black flattened drupes.

3. *V. Ópulus.* Guelder Rose, Snowball Tree. — Leaves variously lobed or deeply toothed. In the wild form only the outer flowers are sterile, but there is a common cultivated



Fig. 119. Viburnum Opulus. (½ nat. size.)

variety (fig. 119) in which they are all barren. There is also a dwarf variety.

V. macrocéphalum, from China, is near *V. Lantàna* in foliage and habit, and the variety in cultivation bears enormous panicles of white neutral flowers. *V. plicàtum*, also from North China, in its globular heads of neutral flowers resembles the Guelder Rose, differing, however, in the plaited oblong-orbicular serrate leaves. *V. rugòsum* is a Canary Islands evergreen shrub with broadly ovate rugose hirsute leaves and large terminal cymes of white and pink flowers. *V. macrophýllum* is a Japanese species with very large glabrous foliage.

8. SAMBŬCUS.

Herbs or shrubs with pinnate leaves and large compound cymes of small white flowers. Calyx-limb 3- to 5-toothed.

Corolla rotate. Stamens 5. Berry 3- to 5-celled; cells one-seeded. There are about ten species, widely dispersed in temperate regions. The name is from *σαμβύκη*, a musical instrument, in reference to the former use of the wood.

1. *S. nìgra.* Elder.—There are several varieties of this common tree in cultivation, including one, *laciniàta*, with the leaves deeply cut, and variegated forms of both varieties, and another with double flowers.

S. Ébulus, Danewort, is an indigenous herbaceous species with leafy stipules and smaller cymes, easily recognised as a congener of the commoner one. *S. racemòsa* is a South European species with yellowish flowers and scarlet berries. *S. Canadénsis* and *S. glaùca* are North American species rarely seen in our gardens.

Order LVIII.—RUBIÀCEÆ.

Sub-Order I.—Stellàtæ.

Herbs with quadrangular stems and whorled entire leaves. Flowers very small, articulated with the pedicel, in axillary or terminal stalked cymes. Calyx-limb superior, annular, or toothed, or obsolete. Corolla rotate, campanulate or funnel-shaped; lobes valvate. Stamens 3 to 5, inserted on the corolla-tube. Fruit didymous, of two 1-seeded lobes. The species are numerous in temperate countries. Our native Goose-grass, or Cleavers, and Bedstraw (*Gàlium* spp.) belong to this sub-order.

1. ASPÉRULA.

Calyx-limb obsolete. Corolla funnel- or bell-shaped, 4-lobed. Stamens 4. There are about fifty species, a few of which are in cultivation. The name is from the Latin *asper*, rough. Many of the species are clothed with hispid hairs.

1. *A. odoràta.*—This is the prettiest of the native species of this family, growing about a foot high, with from six to nine lanceolate cuspidate ciliate leaves in each whorl, and terminal cymes of white flowers. The whole plant exhales a pleasant odour when dry.

2. *A. azùrea*, var. *setòsa.*—This is a very handsome and very hardy annual, growing about a foot or more high. Leaves lanceolate, bristly, about eight in a whorl. Flowers sky-blue,

in terminal heads. Bracts of the involucre shorter than the flowers. A native of the Caucasus.

2. CRUCIANÉLLA.

Hispid herbs remarkable for the long slender tube of the funnel-shaped corolla. The name is a diminutive of *crux*, a cross, from the disposition of the leaves.

1. *C. stylòsa.*—A very pretty plant in an otherwise uninteresting genus. A dwarf tufted perennial with slender straggling stems and whorls of linear acute hispid leaves. Flowers rosy pink, in terminal compact cymes, produced all the Summer. The style is conspicuously exserted beyond the corolla, hence the specific name. Persia.

Houstònia cærùlea, a North American plant of similar appearance, but belonging to another tribe, with opposite leaves and a several-seeded capsule, has lilac-blue flowers, and being of very diminutive growth is well adapted for rock-work. *Mitchélla rèpens* is another North American plant, of creeping habit, having oval persistent leaves, white flowers, and red berries. Some other species of the *Cinchonàceæ* are occasionally seen in the border, but none are perfectly hardy. *Bouvàrdia triphýlla* is one of the best suited for this purpose.

Order LIX.—VALERIANÀCEÆ.

Herbs with opposite entire or pinnatifid leaves and small flowers in dichotomous cymes. Calyx superior, limb lobed or feathery. Corolla funnel-shaped, tube often spurred at the base; lobes 3 to 5, unequal. Stamens 1 to 5; filaments free, slender, exserted. Fruit indehiscent, coriaceous or membranous, with one pendulous seed, and often two empty cells. About twelve genera, and nearly 200 species occur in temperate countries. *Valeriàna officinàlis*, a tall plant with pinnate leaves and pink flowers having three stamens, is a common English plant. *V. montàna* and *V. diòïca* are dwarf species with pink flowers and entire or pinnatifid leaves.

1. CENTRÁNTHUS

Perennial herbs. Leaves entire. Calyx-limb feathery. Corolla-tube slender, flattened longitudinally, divided and spurred at the base. Stamen 1. Fruit membranous. There are ten species, in the north temperate regions of the Old World. Named from κέντρον, a spur, and ἄνθος, a flower.

1. *C. rùber* (fig. 120).—An old inhabitant of cottage gardens. A glabrous plant about 2 or 3 feet high, with smooth leathery lanceolate or ovate leaves and crimson flowers in dense terminal cymes. The flowers are red, crimson or white in different varieties. A plant of wide distribution, and naturalised in some parts of England.

2. *C. macrosìphon.*—An annual of compact habit, glaucous foliage, and rosy carmine flowers rather larger than in the preceding. A native of Spain. There is a white-flowered and a very dwarf variety in cultivation. *Fèdia Cornucòpiæ* is an allied North African annual with lilac-rose or carmine flowers.



Fig. 120. Centranthus ruber. ($\frac{1}{4}$ nat. size.)

Order LX.—DIPSÀCEÆ.

Herbs with opposite exstipulate leaves and capitate involucrate flowers. Calyx superior, enclosed by a bracteolate involucel; limb persistent, cup-shaped, lobed, or with five or more rigid bristles. Corolla-tube funnel-shaped, often curved. Stamens 4; filaments filiform, free, exserted. Fruit indehiscent, covered by the hardened involucel, containing one pendulous albuminous seed. Nearly 150 species are known, included in six genera, mostly Asiatic. The Wild Teasel, *Dípsacus sylvéstris*, is a familiar example of this small order. In this the floral bracts are spinescent and exceed the florets.

1. SCABIÒSA.

Annual or perennial herbs. Leaves entire or pinnatifid. Bracts of the involucre in one or two series. Receptacle convex or columnar, hairy or with scaly bracteoles shorter than the florets. Outer florets often larger. Calyx-limb cup-shaped, surmounted by four or more bristly teeth. The species are estimated at nearly 100. *S. arvénsis* is a pretty native species with large flower-heads, lilac-blue, or rarely white.

1. *S. atropurpùrea* (fig. 121), syn. *Asterocéphalus.* Common

Purple or Sweet Scabious.—A very pretty plant formerly very common in gardens. An annual species, 3 or 4 feet high, with



Fig. 121. Scabiosa atropurpurea. (⅓ nat. size.)

very dark purple, rose, flesh, or white flowers according to the varieties. There is a 'double' variety in which all the florets are larger, and nearly regular, and also a dwarf race. East Indies.

Some of the perennial species are worth a place in large collections, as *S. alpìna* with yellowish flowers, and *S. Caucásica* with bright blue or lilac.

2. MORÌNA.

A small genus of Asiatic herbs resembling the Thistles in their foliage. Flowers in dense clusters in the axils of the upper smaller leaves. Corolla-tube long, slender, curved; limb irregular. Stamens 4, didynamous, or united in pairs. Named in honour of a French botanist.

1. *M. longifòlia.*—A perennial about 2 feet high with large lobed spinescent radical leaves and showy rosy carmine and white flowers, produced in June and July. A native of the Himalayan mountains.

Cephalària Tartárica is an allied tall perennial bearing large heads of pale yellow flowers, in which the involucels exceed the florets.

Order LXI.—COMPOSITÆ.

Herbs, shrubs, or trees. Leaves alternate, whorled, or less frequently opposite, simple or compound, exstipulate. Flowers sessile on the expanded peduncle or receptacle, and surrounded by a number of more or less leafy bracts termed the involucre. Receptacle with or without bracteoles or bristles between the florets. Calyx superior; limb none, or feathery, or scaly, and termed the pappus. Corolla variable in the different tribes. Stamens 4 or 5; anthers usually connate. Style filiform, with a bifid stigma. Fruit dry and indehiscent, containing one erect albuminous seed. A vast order comprising about 1,000 genera and 8,000 species, occurring in all parts of the world. The ornamental species are so numerous that we must confine ourselves to descriptions of a selection of the better known ones which are worthy of cultivation, and merely mention the names of those of secondary importance. They may be conveniently divided into three large groups, and these again into several tribes.

Sub-Order I.—Tubuliflòreæ.

Florets all tubular and hermaphrodite, or the outer or ray-florets ligulate, and female or neuter.

Tribe I.—*VERNÒNIEÆ.*

Leaves usually alternate. Florets all tubular and hermaphrodite. Branches of the style covered with bristles. Not represented in Britain.

1. STOKÈSIA.

A monotypic genus from North America. Flower-heads large, terminal, solitary. Outer bracts of the involucre spiny-

toothed, the inner ciliated. Receptacle naked, fleshy. Outer florets largest. Pappus of one row of membranous scales, nearly equalling the corolla. Named in honour of an English botanist.

1. *S. cyànea.*—Stem herbaceous, covered with a close cottony down, glaucescent, about 2 feet high. Leaves sessile, alternate, lanceolate, acute, with a few spiny teeth near the base; lower ones much longer. Flowers blue, glandular, produced in September. A native of Carolina, and rather tender.

2. PÉCTIS.

Leaves opposite, usually narrow and entire, and furnished with pellucid dots. Flower-head small; involucre of a single row of bracts; receptacle naked. Pappus bristly or scaly. An American genus of about thirty species, of which one hardy annual has lately been introduced.

1. *P. angustifòlia.*—A dwarf annual 4 to 6 inches high with yellow fragrant flowers. North-west America.

Tribe II.—*EUPATORIEÆ.*

Leaves usually opposite. Florets all tubular and hermaphrodite. Branches of the style usually club-shaped or enlarged at the extremities.

3. AGERÀTUM.

Annual herbs with opposite leaves and blue or white flowers. Involucre of many imbricated linear bracts. Receptacle naked. Pappus composed of several awned scales broad at the base. This genus includes a few American species, and one widely distributed throughout the tropics. Name from *ἀ*, not, and *γῆρας*, old age, probably in reference to the absence of white pappus on the achenes.

1. *A. Mexicànum.*—This has long been a favourite bedding and border plant, on account of the profusion of its lilac-blue flowers. There is a white-flowered variety, and recently some dwarf forms have been raised, but unfortunately their beauty is of short duration.

Cœlestínia ageratoìdes and *cærùlea* are closely allied garden plants in which the pappus is toothed and cup-shaped. *Mikània scándens* is a tender South American twining plant with glabrous shining cordate leaves and yellowish white

flowers. It is a member of a large genus, remarkable in having almost constantly four florets in each head. *Nardósmia frà-grans*, Winter Heliotrope, is very near our native Butterbur, *Petasìtes vulgàris*, but it has fragrant flowers.

Eupatòrium cannabìnum, Hemp Agrimony, is one of the tallest and handsomest native plants belonging to this order. It has hairy pinnate or 3-foliolate leaves and pale purple flowers in terminal corymbs, from July to September. Two or three Mexican species of this genus have been recently introduced, and may prove valuable for bedding purposes.

4. LIÀTRIS.

A North American genus of handsome perennials resembling the *Cynàreæ* in habit. Involucral bracts small, numerous, imbricated, in many series. Receptacle naked. Pappus feathery. The name is unexplained.

1. *L. scariòsa.*—About 2 feet high. Leaves very long and narrow. Involucral bracts purple-margined; flower-heads 2 inches in diameter, purple, in an elongated corymb. September.

2. *L. spicàta.*—This grows from 1 to 2 feet high. Stems leafy. Leaves lanceolate, ciliate. Flower-heads sessile, in a long spike, purple. One of the most desirable species, flowering in July, and onwards for a considerable period.

L. odoratíssima and *élegans* are both purple-flowered, the former sweet-scented.

Tribe III.—*ASTEROÌDEÆ.*

Leaves usually alternate. Outer or ray-florets often ligulate, female; disk-florets bisexual. Branches of the style linear, flat, often downy.

5. ÁSTER.

A genus of about 200 species, chiefly from North America. The majority are perennials, often tall and leafy, having the flower-heads arranged in racemes or panicles. Involucral bracts multiseriate. Ray-florets uniseriate, female. Pappus of numerous unequal hispid bristles. Our native Michaelmas Daisy, *A. Tripòlium*, is a good example. Ἀστήρ is the Greek for star, hence the English name Star-flower. The following is a selection of some of the most desirable species.

1. *A. grandiflòrus* (fig. 122).—One of the most distinct species in its solitary flower-heads and small upper leaves. It grows about a yard high, and produces its large purple flowers in October. North America.



Fig. 122. Aster grandiflorus. (¼ nat. size.)

2. *A. Amèllus.*—Erect, about 2 feet high. Leaves oblong or lanceolate, entire, pilose. Flower-heads large, corymbose, violet-blue. A native of Europe, flowering from August to September.

3. *A. alpìnus.*—A handsome dwarf plant about 9 inches high with spathulate crowded radical leaves and solitary flower-heads on erect scapes. Flowers lilac-blue, or more rarely white, appearing in May and onwards. Mountains of Europe.

4. *A. bìcolor*, syn. *A. discolor.*—About 18 inches or 2 feet high. Leaves lanceolate, toothed. Corymbs broad, many-headed. Flowers white or rose, passing into purple, produced towards the end of Summer. North America.

5. *A. Nòva-Ánglicæ.*—A tall hairy species sometimes attaining 6 or 7 feet in height. Leaves lanceolate, sessile, and stem-clasping. Corymbs large, dense. Flower-heads large and showy, purple or red. A native of North America, flowering in September and October.

6. *A. lævis.*—A glabrous plant about 2 feet high. Leaves oblong, shining. Flowers bright blue, in September. North America.

A. cæspitòsus, *A. horizontàlis*, *A. formosíssimus*, *A. élegans*, *A. seríceus*, and *A. pyrenæus* are also showy species, but too near some of the foregoing to be desirable except in botanical collections.

The Australasian genus *Eurýbia* furnishes some handsome evergreen shrubby species, which will succeed in the South-west of England with slight protection in very severe weather.

6. CALLISTÈPHUS (*Callistémma*).

The only species we have to allude to under this head is the all-familiar China Aster, sometimes called *Áster Sinénsis*. This genus is characterised by having an involucre of many fringed bracts, a pitted naked receptacle, and a double pappus. The name is from *καλός*, beautiful, and *στεφάνη*, a crown.

1. *C. hortènsis*. China Aster, Reine-Margüerite.—This beautiful plant was introduced towards the end of the last century, and was raised in the Jardin des Plantes of Paris from seeds sent thither from China by the Jesuit missionary, Father d'Incarville. Being of annual duration, and incapable of being propagated except from seeds, numerous varieties have resulted from its extensive cultivation. In the wild state the flowers are single, that is to say, only the outer florets are strap-shaped, and usually of a rosy-lilac tint, with yellowish disk-florets. But under cultivation all the florets have become ligulate or quilled, and a richness and variety of colouring has been developed scarcely surpassed in any one species, ranging from pure white to deep carmine and violet and nearly blue, though the yellow of the disk in the single has not been reproduced in the double forms. We are mainly indebted to French horticulturists, notably Truffaut, Fontaine, and Vilmorin, for the great perfection to which the different races have been brought. It is worthy of remark that these varieties are so far fixed that they will come true from care-



Fig. 123. Aster, Pæony-flowered. (¼ nat. size.)



Fig. 124. Aster, Truffaut's Perfection. (¼ nat. size.)

fully harvested seed. The garden varieties belong to two distinct classes.

I. Pyramidal Asters, including the *Pœony-flowered* (fig. 123), Truffaut's *Perfection* (fig. 124), *Ranunculus-flowered Pompon*, etc.

II. Anemone or Quilled Asters, including the excessively dwarf varieties.

Both classes have their admirers, and both are equally rich in colour; but all things considered, some of those belonging to the former are to be preferred where both are not grown.

Vittadínia austrâlis or *trilòba* is an Australian annual of dwarf habit, bearing solitary terminal Daisy-like flower-heads, at first white, ultimately changing to red.

7. ERÍGERON.

Herbaceous plants resembling the Asters, but the ray-florets are in several series. Nearly 100 species are known, from cold and temperate regions, but few of them are worthy of cultivation. The name is of Greek origin, signifying early old age, from ἦρ, spring, and γῆρας, old age.

1. *E. glabéllum.*—A glabrous perennial species about a foot high. Leaves linear-lanceolate. Flowers blue; in Summer. A native of North America.

2. *E. speciòsum*, syn. *Stenáctis speciòsa.*—Of about the same stature as the foregoing, but with very numerous narrow ray-florets of a lilac-blue, and a yellow disk. The pappus of the outer florets is in one row, and of the inner in two. California.



Fig. 125. Bellis perennis flore pleno. (½ nat. size.)

E. alpìnum var. *grandiflòrum* with pink or reddish flowers, and *E. Róylei* with pale purple, very dwarf species, especially the latter, are grown by some amateurs.

8. BÉLLIS.

To this genus the Daisy belongs. The distinguishing character is founded upon the conical receptacle and absence of pappus. There are three or four species, in Europe, North Africa,

and North America. From the Latin *bellus*, signifying pretty.

1. *B. perénnis* (fig. 125). Common Daisy.—The double white, crimson, and striped varieties are amongst the prettiest of dwarf herbaceous plants, but they seem to be fast going out of vogue. Perhaps, like some other fashions, they will again come into favour. A handsome variegated form called *aucubæfòlia* is worthy of notice. The Hen-and-Chickens Daisy is a proliferous variety of this species, in which the flower-heads branch out and form several smaller ones.

9. BRACHYCÒME.

Very near the last genus in structure. Involucral bracts membranous at the margin. Receptacle pitted, naked. Fruit compressed, surmounted by a very short bristly pappus; hence the name, from *βραχύς*, short, and *κόμη*, hair. An Australasian genus of upwards of thirty species.

1. *B. iberidifòlia.* Swan River Daisy.—An erect glabrous annual about a foot high. Leaves pinnate; segments linear. Flowers blue or white with a dark centre, about an inch in diameter. A very pretty plant.

10. GRINDÈLIA.

Frutescent or herbaceous plants, often glutinous. Flower-heads solitary, terminal, yellow. Pappus composed of 2 to 8 narrow deciduous bristles. About a dozen species are known. The genus was named in honour of a German botanist. The species are all American and rather tender.

1. *G. grandiflòra.*—An erect biennial species a yard or more high, branching near the top. Radical leaves spathulate; cauline sessile, clasping, dentate. Flower-heads large, ray-florets orange. A native of Texas, flowering all the Summer.

G. squarròsa is a dwarfer species with sharply-toothed leaves and single-headed flowering stems; and *G. inulòides* is an evergreen dwarf species.

11. SOLIDÀGO.

A genus of upwards of 100 species, chiefly from North America. They are usually tall rather coarse-growing herbaceous or frutescent herbs with alternate entire or toothed leaves and terminal scorpioid cymes or panicles of yellow flowers in small but numerous heads. Receptacle naked. Ray-florets

few, uniseriate. Pappus in one series of rigid scabrid bristles. The name is unexplained. *S. Virgaùrea*, Golden Rod, is a native representative of this genus; but some of the North American species are more ornamental, as *S. Canadénsis*, *S. lævigàta*, *S. rígida*, and *S. altíssima*, all tall-growing plants and only admissible in shrubberies and by-places.

Linosỳris vulgàris, Goldilocks, is a rare indigenous plant of close affinity. It grows about 18 inches high, and is densely clothed with linear glabrous entire leaves. Flower-heads small, corymbose; florets all tubular, 5-cleft, yellow.

12. BÁCCHARIS.

A very large genus of American plants, containing many shrubby and arborescent species of very diverse habit, readily distinguished from allied genera by their diœcious flowers. Although there are some 200 species, only one is in general cultivation. Many of the species are resinous and strongly scented, and this name, of Greek origin, was applied to some resinous shrub.

1. *B. halimifòlia.* Groundsel Tree.—A shrub from 6 to 12 feet high with angular branches and obovate or oblong-cuneate coarsely-toothed scurfy leaves very much resembling those of some *Chenopodiàceæ*. Flower-heads small, yellow. The female is the handsomer plant of the two, from its conspicuous silvery pappus. This flourishes near the sea.

13. DÁHLIA.

This popular genus is characterised by having a double involucre, no pappus, and a large scarious bracteole at the base of each floret. It was named in honour of a Swedish botanist named Dahl, and contains probably not more than half a dozen species, all of which are natives of Mexico.

1. *D. variábilis.* Common Dahlia.—This appears to be a variable plant in nature, and has received several names supposed to indicate distinct species, but they are now generally united under the above designation. There were two tolerably distinct forms originally introduced: one, *frustrànea*, in which the outer involucral bracts are spreading; and the other, *supérflua*, having them reflexed and also producing seed more freely. The latter variety was introduced into this country as early as 1789 by the Marchioness of Bute, but soon lost, and not

reintroduced till early in the present century. Little care, however, seems to have been bestowed upon them even then, for, until 1814, when some more plants were imported from France, we read of no progress having been made in raising new varieties. It was first introduced into France about the year 1800 and cultivated for its tubers; but it was not destined to become famous for economical produce. Soon, however, it engaged the attention of numerous horticulturists, and founded its reputation as an ornamental plant of the first



Fig. 126. Dahlia variabilis. ($\frac{1}{8}$ nat. size.)

order. In the wild state the central or disk florets are small, tubular and yellow, and the marginal or ray-florets only conspicuous and highly coloured in some shade of scarlet. But every successive sowing brought forth new variations in colour, and gradually the disk-florets were metamorphosed, assuming the same shape and colour as the outer ones, until at length the 'perfect flower' of florists was attained, in which all the florets are similar, forming an almost spherical head, erroneously termed a double flower (fig. 126). The Dahlia indeed

offers one of the most striking instances of the variability of species under domestication, which is exemplified not only in the modification of the disk-florets but also in the wide range of colours. But so little is understood of the real nature of vegetable colouring matter and the cause of its variability, and to what influences the changes must be ascribed, that we cannot



Fig. 127. Dahlia coccinea. ($\frac{1}{8}$ nat. size.)

correctly estimate the importance of this phenomenon. We know that pure white flowers exist, and that various shades and tints of yellow, scarlet, and purple, and combinations of these colours, are common; but we are not sure whether these colours are not also found in natural varieties. There is evidently a limit in the production of colours, as nothing approaching blue

has been observed in all the varieties raised. Perhaps chemistry may some day tell us why.

The culture of the Dahlia has probably been carried to higher perfection in England than in any other country, for almost without exception the varieties grown are of English raising. Besides the old tall race, a new one of dwarfer stature and another bearing smaller flowers have sprung into existence.

The varieties of the different classes range from 1 to 6 feet or more in height, and the flowers, or more properly flower-heads, from 2 to 5 inches in diameter. The comparatively recent Bouquet or Pompon Dahlias furnish the best varieties for a small garden. In some of these the florets are beautifully fringed, as in the pure white variety *Guiding Star*. For detailed information respecting the numerous varieties we must refer the reader to the catalogues of our great Dahlia growers.

In addition to the above species there are two or three others occasionally seen, including *D. coccínea* (fig. 127), a rather taller plant with large scarlet sometimes semi-double flowers; and *D. imperiàlis*, of recent introduction, and better adapted for a large conservatory than the open air. The latter attains a height of 8 to 12 feet, bearing numerous smaller bell-shaped heads of pure white flowers, with a crimson spot at the base of each floret.

Tribe IV.—*SENECIÓNIDEÆ.*

Leaves variable. Style cylindrical, with linear awns usually fringed at the point, often truncate, or extended beyond the fringe in a cone or other appendage.

14. SÍLPHIUM.

A small genus of herbaceous plants of rather large stature, having opposite whorled or alternate leaves and large yellow monœcious flower-heads. Ray-florets female, and disk-florets barren. Achenes large, flat, winged longitudinally, the latter sometimes toothed at the top, and representing the pappus. Natives of North America.

1. *S. laciniàtum* (fig. 128). Compass Plant or Rosin-Weed. —The slender stems of this species rise to a height of 3 to 6 feet, surmounted by large flower-heads, yellow with a dark centre. It received the name of Compass Plant because it was supposed that the leaves invariably presented their surfaces due north and south; and the second trivial name was given

to it on account of its resinous exudation. There are several other species, but they are rarely seen out of botanic gardens.

15. ZINNIA.

Handsome erect or prostrate annuals with opposite or verticillate sessile or clasping leaves and solitary flower-heads on



Fig. 128. Silphium laciniatum. (¼ nat. size.)



Fig. 129. Zinnia elegans. (¼ nat. size.)

long peduncles. The ray-florets are normally five, and persistent,

and the pappus consists of two bristles. The species are all American, and chiefly from Mexico. The name is commemorative.

1. *Z. élegans* (fig. 129).—In the wild form the flowers are usually of some scarlet shade, but under cultivation it has given birth to varieties with white, yellow, orange, pink, crimson, and purple flowers, and many intermediate tints and mixtures rarely seen in flowers. There are also 'double'-flowered varieties and a dwarf strain. One of the great qualities of this plant is the durability of its flowers.

Z. Mexicàna, syn. *Z. aùrea*, and *Z. Ghiesbréchtii*, have orange flowers, the former of prostrate and the latter of erect habit. There are also other species, but none equal to the above.

16. POLÝMNIA.

Herbs with alternate or opposite usually very large leaves. Flower-heads in corymbs, ray usually yellow, and the disk dark purple. Ray-florets female; disk-florets male. Pappus none. The species, about eight or ten in number, are natives of North and South America, and those in cultivation are grown mainly for the fine effect of their foliage in the 'sub-tropical garden.' *P. Canadénsis*, *P. Uvedàlia*, and *P. maculàta* are the species usually seen. The two former are nearly or quite hardy. We may here mention a few other *Compósitæ* with ornamental foliage employed in the same way, though they are mostly tender subjects. *Ferdinánda éminens*, more correctly *Cosmophýllum cacaliæfòlium*, a native of Mexico, attaining a height of 3 or 4 yards, and bearing leaves 18 inches or 2 feet across. *Schistocárpha bìcolor*, syn. *Perymènium díscolor*, is another allied plant, from Caraccas, with large ornamental foliage. *Montanòa heracleifòlia*, syn. *Ũhdea bipinnatífida*, and improperly called *Montagnæa*, grows 12 to 15 feet high, and is valuable for its noble foliage. The genus *Verbesìna* may also be included here as furnishing some decorative species. It is characterised by having a flat receptacle with chaffy scales and flattened achenes with two bristle-like awns. Like the preceding plants they are gigantic herbs or shrubs, and more ornamental in foliage than inflorescence. *V. alàta gigántea* and *pinnatífida* or *Sartòrii* are the species usually grown.

17. RUDBÉCKIA.

(Including *Echinàcea* and *Obeliscària.*)

North American herbaceous perennial plants with simple or pinnate opposite or alternate leaves and showy flower-heads of brightly coloured florets. Receptacle conical, with chaffy scales at the base of the florets. Achenes quadrangular, with a minute pappus or none. The species number from fifteen to twenty, and all are hardy or nearly so. Named after a Swedish botanist.

1. *R. purpùrea*, syn. *Echinàceà serótina*, etc. (fig. 130).—A plant about a yard high, rough to the touch, with ovate-lanceolate



Fig. 130. Rudbeckia purpurea. (⅛ nat. size.)



Fig. 131. Rudbeckia Drummondii. (⅛ nat. size.)

obscurely dentate leaves and large flower-heads nearly 4 inches in diameter. The prominent disk is dark brown, and the ray bright reddish purple. *R. intermèdia*, with rather broader more

deeply coloured and spreading not deflexed more numerous ray-florets, is said to be an improved variety of this species, or perhaps a hybrid between it and some other. A native of the southern United States, flowering in Summer.

R. aspérrima and *R. angustifòlia* are closely allied species: the former with pale rose flowers, in which the florets are narrow, numerous, and toothed at the tip; and the latter with narrow leaves and purplish flowers.

2. *R. Drummóndii*, syn. *Lepàchys columnàris*, *Obeliscària pulchérrima*, etc. (fig. 131).—A very showy species in some of its varieties. The pinnatisect leaves and elevated disk are the most conspicuous features in this species. The ray-florets are bright yellow, or orange-red and yellow, and in one variety they are fewer in number and broader than those represented in the figure. A native of Texas, growing from 2 to 3 feet high, and flowering in August.

3. *R. fúlgida*, syn. *R. chrysomèla*.—A distinct species about 2 feet high with leafy peduncles and yellow flowers about 2 inches in diameter with a purplish brown centre. Ray-florets numerous, emarginate. A North American species flowering in July and August.

R. élegans of dwarfer habit, and *R. grandiflòra* with larger flowers, are near the last. The latter is rather tender.

18. COREÓPSIS (*Calliópsis*).

Annual or perennial showy usually glabrous herbs, natives of North America. Leaves simple or pinnate, opposite. Involucral bracts in two rows, the outer spreading and the inner combined at the base and erect. Receptacle furnished with linear chaffy scales. Fruit-achenes incurved, or flat on one side and convex on the other, 2-awned or truncate at the apex. The flowers of some species are strikingly beautiful, having a distinct brightly coloured eye, hence the application of the second name to some of them; and *Coreópsis* is a compound of *κόρις*, a bug, and *ὄψις*, resemblance, from the appearance of the 2-awned achenes.

Annual Species.

1. *C. tinctòria*.—A slender species about 2 feet high. Leaves pinnate; segments linear. Ray-florets few, broad, jagged at the tip. There are several varieties, differing in the colour of the flowers. The variety *atropurpùrea* has them of

a deep crimson purple with here and there a dash of orange, and in the ordinary form they are yellow with a purple-brown blotch at the base.

2. *C. Drummóndii.*—A much dwarfer spreading slightly hairy species with orange-coloured flowers. Leaves pinnate, with ovate or lanceolate lobes.



Fig. 132. Coreopsis auriculata. (½ nat. size.)

C. coronàta is another annual species about 1 foot high, bearing orange flowers spotted with brown.

Perennial Species.

3. *C. auriculàta* (fig. 132).—A tall slender branching plant. Leaves auricled at the base. Flowers yellow, with a band of purple-brown encircling the disk; peduncles very long and slender. Summer.

4. *C. tenuifòlia.*—About 2 feet high. Leaves pinnately divided into numerous fine segments. Flowers yellow, about 1½ inch in diameter, on short peduncles.

C. trípteris has trifoliolate leaves and yellow flowers; *C. lanceolàta* entire leaves and large yellow flowers; and *C. verticillàta*, sessile leaves divided to the base into six or seven linear segments, and yellow flowers with a dark eye. *C. aristòsa* is a handsome species of recent introduction. It is nearly glabrous, about a yard high,

with pinnatisect leaves and large bright orange-yellow flower-heads. Pappus of two long spreading bristles.

19. HELIÁNTHUS.

Tall coarse herbs, mostly natives of North America. Leaves large, simple, scabrid. Flower-heads very large, yellow with a dark centre. The Jerusalem Artichoke (*H. tuberòsus*) is a familiar species of this genus. The name is from *ἥλιος*, sun, and *ἄνθος*, a flower.

1. *H. ánnuus.* Sunflower.—This is the most familiar of South American plants, producing, perhaps, larger flower-heads than any other species in the order. There are several varieties in cultivation, differing in stature, size, and colour of flowers; and there is a double variety with all the florets ligulate.

2. *H. argyrophýllus.*—This is an allied species in which the leaves are clothed with a soft silky silvery down. It grows about 6 feet high, with rather smaller flower-heads of the same colour. Some garden varieties appear to be intermediate between this and the preceding.

3. *H. multiflòrus* (fig. 133).—Perennial, about 4 or 5 feet high, with more numerous smaller flower-heads. There is a double variety in cultivation.

4. *H. orgyàlis.*—A perennial species as tall as the Common Sunflower, but much slenderer, and narrow-leaved. Flower-heads comparatively small and numerous, forming a large panicle.



Fig. 133. Helianthus multiflorus. (¼ nat. size.)

Tithònia spléndens, or *Comaclínium aurantìacum*, is a handsome half-hardy perennial from Mexico, growing about 5 or 6 feet high, with large

3-lobed leaves and Zinnia-like scarlet flowers produced in Autumn. And *Harpàlium rígidum* is another allied plant, a native of North America, and quite hardy. It rises about a yard high, and is furnished with opposite oval leaves and yellow flower-heads about half the size of the Sunflower, but much more numerous and of longer duration.

20. COSMÍDIUM.

A small group of annuals of close affinity with *Coreópsis*; but the achenes are long and narrow, and covered with minute tubercles, and closely embraced by the bracteoles of the receptacle, which fall away with them. The pappus consists of two short stout bristles. Natives of North America.

1. *C. Burridgeànum.*—About 18 inches high. Leaves finely cut. Capitules on long naked slender peduncles, about 2 inches in diameter. Ray-florets about eight. In the original variety the disk is purple, and the ray bright orange with a purple spot at the base of each floret; but under cultivation it has varied. One of the prettiest variations, called *atropurpùreum*, has the heads of a crimson-purple bordered with orange.



Fig. 134. Cosmos bipinnatus. (¼ nat. size.)

C. filifòlium has the rays entirely yellow with a brown disk; and *C. Engelmánnii* is a dwarf species with wholly yellow flowers.

21. CÓSMOS (*Cósmea*).

Annuals or perennials with pinnate leaves and solitary flower-heads. Receptacle furnished with linear acute coloured bracteoles, equalling or exceeding the florets. Achenes angular, largest in the middle, crowned with three or four rigid bristles. Κόσμος signifies beautiful or perfect.

1. *C. bipinnàtus* (fig. 134).—An elegant annual about 2 feet high. Flowers rose or purple with a yellow eye, appearing late in Summer. Mexico.

2. *C. diversifòlius*, syn. *Dáhlia Zimapàni.*—A tuberous-rooted dwarf perennial with Dahlia-like foliage and uniform dark purple flowers.

22. SANVITÀLIA.

There is one annual species of this genus in cultivation, which is pretty well known. The characters are: involucral bracts numerous, in two or three series; receptacle bracteolate; achenes of the disk crowned with a pappus of three bristles, and those of the ray muricate or winged. A commemorative name.

1. *S. procúmbens.* — A trailing glabrous much-branched plant, having ovate entire leaves and bright yellow flower-heads with a black centre. There is a double variety of recent acquisition. Native of Mexico.

23. TAGÈTES.

Handsome annual or perennial plants, emitting a powerful and somewhat disagreeable odour when bruised or touched. Leaves pinnate or simple. Involucre composed of about five bracts, cohering in a tube. Florets normally 5, or rarely fewer, persistent. Achenes linear, elongated, surmounted by a pappus of five bristles. About fifteen species are known, all American. The name is of classical origin.



Fig. 135. Tagetes patula. (½ nat. size.)

1. *T. pátula* (fig. 135). French Marigold. — This and the next species are ranked amongst the earliest of cultivated ornamental plants, having been grown in our gardens for nearly three centuries. There are many handsome varieties in which the florets are enlarged and more numerous than in the wild form, ranging from 9 inches to 2 feet in height, and varying in

colour from pale yellow and orange to a rich orange-brown, and striped or bordered. A native of Mexico.

2. *T. erécta* (fig. 136). African Marigold.—This species has not varied to the same extent, not having developed the rich velvety brown colour so prominent in some varieties of the preceding. The lemon and orange-coloured double varieties are very showy, and there is a dwarf race. This is also a native of Mexico.



Fig. 136. Tagetes erecta. (⅓ nat. size.)

3. *T. tenuifòlia.*—An erect slightly branched annual with pinnatisect serrate leaves. Peduncles 1-headed, naked. Pappus of five scales, four of which are united, and the fifth free and longer. Flowers yellow. Mexico.

4. *T. signàta.*—A species of more recent introduction, resembling *T. pátula*, and superior in some of its very dwarf varieties, but differing in the pappus, which is composed of five truncate scales. The flower-heads are smaller but very abundant, and produced in uninterrupted succession till late in Autumn. Mexico.

5. *T. lùcida.*—A very distinct free blooming perennial species, though it is usually treated as an annual. Leaves simple, oblong-lanceolate, coarsely serrated. Flower-heads corymbose, about 9 lines in diameter, of a rich yellow. This species has the aspect of a Cruciferous plant, from the number of the ray-florets being usually four and broad, whilst the disk-florets are few and small, having the appearance of stamens at a little distance. Peru.

24. GAILLÁRDIA.

Handsome annual or perennial North American herbs. Leaves usually simple, entire, toothed, or pinnatifid. Flower-heads on long naked peduncles. Receptacle furnished with filiform

bristles between the florets. Ray-florets neuter. Achenes hairy; pappus of few membranous pointed scales. There are about six species. Named in honour of a French botanist.

1. *G. aristàta.*—A perennial about 18 inches high. Leaves lanceolate, entire, or remotely toothed. Flower-heads about 2 inches across, normally yellow, with prominent exserted reddish styles in the rather large disk. But it has given birth to several varieties far surpassing the original in brilliancy of colouring, as, for example, *grandiflòra* (fig. 137), with a dark brown disk and the lower part of the ray crimson shading off into orange and bordered with yellow. Some of these varieties have probably arisen from crosses between this and the following species.



Fig. 137. Gaillardia aristata, var. grandiflora. (¼ nat. size.)

2. *G. Drummóndii*, syn. *pícta.* — Also perennial, with rather larger leaves coarsely and sparsely toothed or lobed. Flower-heads crimson and yellow, larger than in the preceding. *G. D. trìcolor* is a semi-double variety, having the rays purple at the base, white in the middle, and yellow at the tips. The familiar *bìcolor* is referred to this species. Perhaps these and the preceding should be included under one species.

There are some other species: as, *Richardsòni*, brown disk and yellow ray; *coronàta*, brown and orange-red.

Hymenóxis Califórnica is a slender branching annual with glabrous pinnatifid leaves and yellow flower-heads on long slender peduncles. Receptacle paleaceous, glandular. Pappus chaffy.

The genus *Helènium* is composed of a few tall perennial species, natives of North America. Receptacle chaffy, between

the ray-florets only. Pappus of five bristles. Involucral bracts in one series, united at the base. Ray-florets toothed at the tip. *H. atropurpùreum* has yellow and brown flower-heads, and *H. grandiflòrum* has them large and yellow.

Sphenógyne speciòsa is a showy South American annual of dwarf stature, bipinnatifid leaves with narrow segments, and flower-heads about 2 inches in diameter on long slender peduncles. Ray-florets numerous, yellow; disk black. There is a variety *aùrea* with orange rays.



Fig. 138. Achillea filipendulina. (¼ nat. size.)

Madària élegans is an erect glandular annual about 2 feet high. Leaves linear, acute, entire. Flower-heads showy, in racemose bracteolate panicles, the terminal ones expanding first. Ray-florets numerous, deeply lobed at the extremity, yellow with a crimson-brown blotch at the base. California.

Anthèmis tinctòria is a congener of our indigenous Chamomile, growing about 3 feet high. Leaves finely divided. Flower-heads numerous, bright yellow or occasionally pale yellow, or even white. Native of the South of Europe and a very profuse bloomer.

25. ACHILLÈA.

Perennials with alternate simple or compound leaves. Flower-heads small, corymbose; involucral bracts oblong, often brown and scarious. Receptacle paleaceous. Ray-florets few, sometimes relatively large and showy. Pappus none. The species are estimated at

fifty, dispersed over Europe, temperate Asia, and North America. The name is of classical origin.

1. *A. Millefòlium.* Yarrow.—The pink- or purple-flowered varieties of this common weed are equally effective with any of the other species and of long duration. The leaves are tri-pinnately divided into numerous linear segments and the flowers usually white.

2. *A. filipendulìna* (fig. 138).—This is very near the preceding but rather taller and having less finely-cut leaves, and pretty bright yellow flowers.

A. Ægyptìaca and *A. tomentòsa* are dwarf tufted species with finely-cut cottony leaves and yellow flowers.

3. *A. Ptármica.* Sneezewort.—The only other native species. The leaves are simple and serrulate, the ray-florets larger, and the flower-heads larger and less numerous. There is a double white variety of this worthy of cultivation.

4. *A. Clavénnæ.*—A dwarf species belonging to the same group as the last. It grows about 6 inches, and is densely clothed with a white hoary tomentum. Leaves bipinnatifid. Segments broader than in the other species enumerated.

26. SANTOLÌNA.

Small evergreen shrubs with solitary spherical rayless flower-heads on long peduncles. Achenes terete, destitute of pappus. Corolla-tube with a hood-like appendage on the base. The species are all natives of the Mediterranean region. The name is combinative of *sanctus*, holy, and *linum*, flax, in allusion to the reputed medicinal properties of some species.

1. *S. Chamæ-cyparíssus.* Cotton Lavender.—A dwarf densely-branched shrub clothed with a close hoary pubescence. Leaves alternate, dense, linear, with 4 or 6 rows of short obtuse teeth projecting in all directions. Flower-heads yellow, on peduncles from 6 to 12 inches long. There are several varieties under different names, as *incàna*, *squarròsa*, etc.

S. alpìna is a prostrate species with deeply-cut leaves and erect flower-stalks.

Lasthènia glabràta is a showy hardy annual from California. Leaves linear, opposite. Flowers yellow.

27. CHRYSÁNTHEMUM (*Pyrèthrum*).

Annual or perennial herbs, rarely frutescent. Leaves various. Involucral bracts many, imbricated, scarious on the margin,

Receptacle naked. Pappus none or cup-shaped. The species are natives of Europe, Asia, and North Africa. The name is from *χρυσός*, golden, and *ἄνθεμον*, flowers, but it is only applicable to some species. Some of the species are separated under the name *Pyrèthrum*, from having a cup-shaped membranous pappus. The first name is retained because it is in general use. The Ox-eye Daisy, *C. Leucánthemum*, and the Corn Marigold, *C ségetum*, are two familiar native species.

1. *Ch. Sinénse*, including *Ch. Indicum*.—These two names designate two tolerably distinct races which are now generally believed to have sprung from one and the same species. However this may be, some of the varieties in cultivation at the present time cannot be referred to one or the other with certainty, and to these has recently been added a third group of varieties from Japan remarkable alike for their ragged grotesque-looking flower-heads and the unusual tints of the flowers. The history of the garden varieties is rather obscure, and the wild form is unknown to botanists, but the later progress in the production of improved varieties is more familiar. In some books we find the year 1764 given as the date of the original introduction of some Chinese variety or varieties. But 1790 is the earliest authentic account we have, at which period it was introduced into France by a merchant named Blanchard; and in 1826 an amateur of Toulouse named Bernet conceived the idea of raising plants from seed, which resulted in the acquisition of some new varieties. This method was soon adopted by other growers, at first in France and subsequently in England, where Chrysanthemums now receive more attention than in any other country. The variety or race called *Indicum* was imported from China about the year 1835, and this was subjected to the same procedure, and crossed with varieties of the older strain.

We must not omit to mention that, besides the ordinary double flowers of this family, in which the florets are elongated on one side only, there is another form having the disk florets elongated and regularly 5-toothed. Varieties of the latter class were introduced by Fortune. The colours and tints of Chrysanthemums belong to the red, yellow, and orange group, with innumerable intermediate hues and pure white. Florists divide them into Large-flowered (fig. 139) and Small-flowered or Pompon (fig. 140); the former being the type of those first introduced. There are also the Japanese varieties

alluded to above, with curious elongated often very narrow florets.

2. *Ch. Parthènium* (*Pyrèthrum*). Feverfew.—This plant was formerly cultivated as a medicinal herb, and has become



Fig. 139. Chrysanthemum Sinense, large-flowered variety. (¼ nat. size.)



Fig. 140. Chrysanthemum Sinense, Pompon var. (¼ nat. size.)

naturalised in some parts of the country. It is from 1 to 2 feet high, with the leaves pinnately divided into broad lobed segments. Flowers about 6 lines in diameter with a white ray. We mention this merely to introduce the double-flowered variety, *eximium*; and one with yellow foliage, *aùreum*, extensively employed in bedding under the name of Golden Feather.

3. *Ch. ròseum* (fig. 141).—This may be classed with the so-called Florists' flowers, having produced a great many beautiful varieties which now figure in our principal catalogues under distinct names. In the typical form it grows about 18 inches high, with beautifully cut foliage and flower-heads about 2 inches in diameter, yellow in the centre, with a rose or pink

ray. The disk is large and the ray-florets relatively short. It is a native of the Caucasus. The garden varieties are either



Fig. 141. Chrysanthemum roseum. (¼ nat. size.)



Fig. 142. Ch. coronarium. (¼ nat. size.)

single or double, with the florets plain or fringed, white, salmon, pink, rose, crimson, or purple of some shade, or two-coloured. They begin to bloom in May and continue for a long period.

4. *Ch. Tchihatchéwii.*—This species is unfortunate in its name, but said to be useful for covering banks. It is a trailing perennial with small bipinnatifid glabrous dark green leaves toothed at the base of the petiole and small white flowers.

5. *Ch. coronàrium* (fig. 142).—A branching annual from 2 to 3 feet high bearing a profusion of single or double yellow

flowers, according to the variety. A native of the South of Europe.

6. *Ch. carinàtum*, syn. *Ch. trìcolor* (fig. 143).—Another annual species, superior to the last as an ornamental plant.



Fig. 143. Chrysanthemum carinatum. (½ nat. size.)

Foliage glaucous. Flowers normally white and yellow with a brown centre, but there are several improved garden varieties, including double ones, yellow, crimson, or purple, or one of these colours with a brown centre. A native of North Africa.

Dimorphothèca pluviàlis, Cape Marigold, is a pretty annual. Leaves narrow, sinuately lobed; florets of the ray white within, violet without; disk brown.

Athanàsia ánnua is a native of Barbary growing about 2 feet high, and valuable on account of the long duration of its clustered rayless yellow flower-heads. Stem furrowed. Leaves fleshy, pinnatifidly divided into linear segments.

28. RHODÁNTHE (*Acroclínium*).

Elegant little annuals with everlasting flower-heads. Involucral scales scarious, outer ones sessile, inner clawed, coloured and petaloid. Receptacle naked; florets all tubular and similar. Achenes villous, not beaked; pappus feathery, in a single row. The two or three species here included are Australian. Name from *ῥόδον*, a rose, and *ἄνθος*, a flower, in allusion to the colour of the flower-heads.

It is worthy of remark that here, as in most other 'Everlasting Flowers' belonging to this order, the coloured conspicuous and lasting part is the involucre.

1. *R. Manglésii.*—From a foot to 18 inches high, with smooth glaucous oblong entire perfoliate leaves and a branching inflorescence. Outer bracts silvery. Flower-heads pedunculate, delicate rose-pink with a yellow centre. The variety *maculàta* has a dark band around the disk; and *álba* has all the bracts of a silvery white. *R. atrosanguínea* has purple florets and is otherwise very distinct.

2. *R.ròsea*, syn. *Acroclínium ròseum.*—This species is perhaps even handsomer than the preceding. It is a more erect plant, from 1 to 2 feet high, having linear acute leaves and larger solitary terminal flower-heads. Outer bracts brown, inner pink or white; florets yellow.

29. WÁITZIA (*Mórna*).

Annuals of less graceful habit than those in the last genus, but almost identical in floral characters, the main difference being in the achenes, which terminate in a slender beak bearing the pappus. Involucral bracts all coloured, gradually passing from small sessile outer ones to those with a slender claw and large limb. There are about six species, all from Australia. This genus was named in honour of a German botanist.

1. *W. corymbòsa*, syn. *W. acuminàta.*—An erect and branching plant clothed with a rough pubescence. Leaves linear, with revolute margins clasping the stem. Flower-heads yellow or pink, in dense terminal corymbs. Involucral bracts with long acuminate points, usually with a few straggling ones below the head. Terminal beak much longer than the achene.

2. *W. aùrea*, syn. *Mórna nítida.*—Very near the last, with less pointed bracts of a golden yellow, and the flower-heads in a looser corymb.

W. Steetziàna, syn. *W. tenélla*, is a dwarfer plant with smaller flower-heads from pure white to a bright yellow; and *W. nívea* is very near No. 2, differing however in having comparatively longer florets and white or pink bracts.

30. PODOLÈPIS.

This is another Australian genus of the same tribe. In this the involucral bracts are erect or not distinctly spreading as in the foregoing genera, and the outer florets are ligulate or irregular. Achenes not beaked. Pappus of simple or feathery bristles. Name from πούς, a foot, and λεπίς, a scale, from the scaly bracts on the peduncles.

1. *P. acuminàta*, syn. *Scàlea jaceoìdes.*—Perennial, but treated as an annual in gardens, and growing about 18 inches high. Leaves petiolate, oblong or lanceolate, smaller upwards, and clasping the stem. Involucral bracts scarious. Florets yellow, exceeding the involucre.

P. chrysántha, syn. *aristàta*, is an allied species in which the involucral bracts are terminated by a fine bristle.

P. grácilis is a more delicate plant with purple, lilac, or white florets.



Fig. 144. Helichrysum bracteatum. (½ nat. size.)

31. HELICHRŸSUM.

To this and the next genus belong the true Everlasting Flowers or Immortelles, or at least those generally cultivated and sold under these names. The species we have to notice are all treated as annuals, and are tall leafy plants with solitary large flower-heads, in which the involucral bracts are spreading or recurved, or clustered and small with incurved bracts.

The involucral bracts are scarious, but not silvery or semi-transparent, and the angular achenes are not beaked, and the pappus is rough or pilose. Taken in its widest sense the genus comprehends nearly 300 species, mostly of an ornamental character; but we must confine ourselves to the two or three species in general cultivation. The name is from *ἥλιος*, the sun, and *χρυσός*, gold, in allusion to the flower-heads.

1. *H. bracteàtum* (fig. 144).—This is the large-flowered species, of which there are white, yellow, pink, crimson, and other varieties in cultivation. *H. acuminàtum*, *macrocéphalum* and *chrysánthum* are considered as simple forms of this species. Australia.

2. *H. apiculàtum*, syn. *Chrysocéphalum helichrysoìdes*, *Gnaphàlium flavíssimum*, etc.—This is of rather dwarfer stature than the foregoing and covered with a silvery tomentum. But the great distinction lies in the small clustered yellow heads. Australia.

H. Stœchas is a South European shrubby species, and *H. petiolàtum*, syn. *Gnaphàlium lanàtum*, is the trailing species with woolly leaves commonly used for edging beds.

32. HELÍPTERUM.

This genus differs from *Helichrỳsum* in having a soft feathery pappus. The species are numerous, inhabiting the southern and western parts of Australia and South Africa. *H. exímium* is a beautiful Cape species with thick woolly leaves and crimson globular flower-heads. *H. speciosíssimum*, from the same country, has white and orange flower-heads. There are three or four annual species, natives of Australia, in cultivation.

1. *H. incànum*, syn. *H. brachyrhýnchum*.—A dwarf tufted branching plant covered with a silvery down. Leaves linear, crowded at the base of the stem. Flower-heads large, on leafless peduncles. Involucral bracts yellow, pink, or white.

2. *H. Sanfórdii*, syn. *H. Humbóldtii*.—In this species the flower-heads are small and numerous, in dense clusters, bright yellow changing to a mineral green when dry.

Lawrencélla ròsea, sometimes referred to *Helichrỳsum*, is an annual about 1 foot high, with linear nearly glabrous leaves and pink or white flower-heads on long peduncles. And *Schœnia oppositifòlia* is separated from the neighbouring genera on

account of the central achenes being abortive and the outer fertile ones being broad and flat with a pappus of barbellate bristles. It is the only species, an annual from 1 to 2 feet high with a rough or woolly pubescence and corymbose flower-heads. Outer involucral bracts brown, inner clawed, with a spreading white or pink limb.

We might extend this enumeration, but as they are chiefly delicate annuals we believe we have given an ample selection.

33. AMMÒBIUM.

This genus also belongs to the Everlasting group, but it differs from all the preceding genera in having scales or bracteoles on the receptacle between the florets, and quadrangular achenes crowned with a membranous cup-like pappus. There are only two species, both Australian. The name is from *ἄμμος*, sandy sea-shore, and *βίος*, life, in allusion to the habitat of the following species.

1. *A. alàtum* (fig. 145). —Annual or perennial, about 18 inches high. Stems winged; leaves sparse. Involucral bracts white; florets all tubular, yellow, exceeding the involucre.



Fig. 145. Ammobium alatum. (½ nat. size.)

34. HŪMEA.

Though the only species in cultivation is widely different in aspect and habit from its allies, the structure of the minute flower-heads will be found to agree. Involucre of small imbricated scales. Receptacle bracteolate, containing three or four florets. Pappus none. An Australian genus of few species, named in honour of Lady Hume.

1. *H. élegans.*—A biennial attaining a height of 5 or 6 feet. Leaves large, oblong or lanceolate, clasping or decurrent at the base. Flower-heads minute, brownish-red, pink or crimson, in a large loosely branched terminal drooping panicle. When well grown this forms an elegant and graceful centre for small beds or for planting in mixed borders.

This group would be hardly complete without a notice of the perennial Everlastings belonging to the dicœcious genus *Antennària.* These plants are inferior in beauty, but the fact of their being perfectly hardy will recommend them. They are densely woolly plants. *A. dioïca* is a British species growing about 4 inches high, and bearing small corymbs of red flower-heads. *A. Margaritàcea* rises to a height of 2 or 3 feet, terminated by compact clusters of white flower-heads.

Emília sagittàta, syn. *Cacàlia coccínea.* — A glabrous glaucous erect annual about 18 inches high. Leaves ovate, coarsely toothed, cordate or sagittate at the base. Flower-heads rayless, scarlet or orange, in terminal corymbs. Involucral bracts in one row, erect. Achenes pentagonal, hairy on the angles; pappus filiform, in many series.

Cinerària marítima is a perennial from the Mediterranean shores with handsome silvery tomentose finely-cut foliage and yellow flower-heads. There is a variety with broader leaves known as *acanthifòlia.*

Ligulària Kæmpfèri, syn. *Farfùgium gránde.* — This is also remarkable in its foliage. It is a stemless herb with large orbicular-cordate dark green glabrous shining leaves irregularly blotched with yellow, and elevated on long petioles. A native of China.

Árnica montàna. Mountain Tobacco.—A tufted perennial. Leaves radical, except a few small ones on the flower-stem, oblong-lanceolate, entire. Flower-stem about a foot high; flowers yellow, three or four together, about 2 inches in diameter; ray-florets numerous. There are several allied plants of similar

habit referred to the genus *Aronìcum*, but the scapes bear only one flower-head each.

35. DORONÌCUM.

Herbs with few cauline and simple radical leaves, and yellow flowers. Involucral bracts in two or three series, equal. Disk-florets perfect, ray female, destitute of pappus. The species are natives of Europe and Asia. The derivation of the name is obscure, though it is said to be of Arabic origin.

1. *D. Caucásicum* (fig. 146).—Valuable on account of its early and abundant orange-coloured flower-heads, which appear in April and May.

2. *D. Pardaliánches*. Common Leopard's Bane.—This is a commoner plant in English gardens, and naturalised in some districts. It is near the foregoing, but taller, and its pale yellow flower-heads are not so early.



Fig. 146. Doronicum Caucasicum. (¼ nat. size.)

36. SENÈCIO.

This vast genus contains several hundred species, but only one need occupy our attention here. The chief character is the involucre of one row of equal bracts. Flower-heads often destitute of ray-florets, as in *S. vulgàris*, the common Groundsel; or rayed, as in *S. Jacobæa*, the Ragwort. The name is derived from *senex*, an old man, in allusion to the abundant silvery pappus, or, as it is sometimes explained, the naked or bald receptacle.

1. *S. élegans*.—This commonly bears the name of *Jacobæa*, which belongs to another species. It is a very familiar plant in gardens, especially the double purple variety. There are also white, flesh, rose, and crimson varieties, which will come true from seeds. South Africa.

Tribe V.—*CYNÀREÆ.*

Leaves alternate, often spinescent. Involucral bracts usually imbricate and prickly. Florets, in most genera, all tubular; tube slender, ventricose. Lobes of the style with a swelling or ring of hairs at their base.

37. CALÉNDULA.

The peculiarity of this genus is the rayed flower-heads, the ray-florets being female, and the disk-florets male. Only one species comes within our province. The generic name is derived from the Latin *calendæ*, in allusion to the constant flowering of the common species.



Fig. 147. Calendula officinalis flore pleno. (¼ nat. size.)

1. *C. officinàlis.* Common Marigold.—This familiar annual is a native of the South of Europe. Like many other Composites it has undergone considerable modification in the florets, forming the double flower (fig. 147) of florists. The bright orange flowers are very showy, in the latter variety particularly so.

38. ARCTÓTIS.

South African plants bearing conspicuous orange-rayed flower-heads. Involucral bracts numerous, imbricated, scarious on the margin. Receptacled, pitted, studded with bristles between the florets. Achenes grooved, crowned with a pappus of membranous scales. Name from *ἄρκτος*, a bear, and *οὖς*, an ear, probably in allusion to the woolly leaves.

1. *A. speciòsa*, syn. *A. breviscàpa.*—A prostrate tufted tomentose annual. Leaves entire or pinnatifid. Flower-heads

large, terminal, disk brown, ray orange, closed in dull weather. *A. acaùlis* and *undulàta* are referred hither as varieties, differing only in the shades of yellow in the ray-florets.

Venídium calendulàceum is an allied Cape annual, growing in dense dwarf tufts. Leaves large, obovate, lyrate, pubescent. Flower-heads terminal, similar to those of the Marigold. It differs from the last genus in the absence of, or, if present, minute pappus.

39. GAZÀNIA.

Another South African genus of showy-flowered herbs, possessing the same peculiarity of opening in bright weather only. Involucral bracts cohering to nearly the summit. Ray-florets neuter, disk-florets perfect. Achenes hairy, with a double pappus of finely-toothed scales. The name is an amplification of γάζα, richness.

1. *G. splèndens.*—This trailing perennial plant is much in vogue for bedding, and produces a very brilliant effect in sunny weather. Leaves linear, spathulate, silky, white below. Flower-heads large, ray bright orange with a black and white spot at the base of each floret, disk of a paler yellow. It is believed to be of hybrid origin.



Fig. 148. Echinops Ruthenious. (¼ nat. size.)

G. Pavònia has pinnatifid hairy leaves and large handsome flower-heads with broad ray-florets in which the spot at the base is brown with a white central dot and a tinge of green. *G. rigens* and *G. uniflòra* are two of the original species from which the garden varieties have been raised. The former is near *splèndens*, and the latter has smaller pale yellow flowers.

40. ECHÌNOPS.

Herbs of Thistle-like aspect remarkable for having the capitules 1-flowered in terminal clusters, resembling the flower-heads of many other genera. Florets white or blue, with an involucre of prickly scales and bristles. The cluster of heads or capitules is surrounded by an involucre of linear scales, thus completing the appearance of a single head. The species are chiefly from the Mediterranean region. The name is from ἐχῖνος, a hedgehog, and ὄψις, resemblance. They are commonly known as Globe Thistles.

1. *E. Ruthénicus* (fig. 148).—Perennial rising to a height of 2 or 3 feet. Florets blue. A native of Germany, flowering all the Summer.

2. *E. Rìtro.*—Very near the foregoing, with pinnatifid not spinescent leaves, downy beneath, and webbed above. South of Europe.

3. *E. cornígerus.*—This has very spiny silvery foliage and large white flower-heads. Central Asia.

4. *E. sphærocéphalus.*—A taller plant attaining a height of 5 or 6 feet. Leaves large, pinnatifid, clothed with a cottony down beneath. Flower-heads very numerous, blue. South of Europe.

41. XERÁNTHEMUM.

Annuals from the Mediterranean region having the coloured radiating scarious involucral bracts of the Everlastings, and employed for the same purposes; but the other characters are those of the Thistle tribe. Receptacle paleaceous, pappus bristly. Outer involucral bracts brown, small, scaly, imbricated. The name indicates the nature of the flower-heads, being a compound of ξηρός, dry, and ἄνθεμον, flower.

1. *X. ánnuum.*—A branching plant from 1 to 2 feet high, with linear cottony leaves and solitary terminal purple, pink or white flower-heads on long peduncles.

42. CENTAŬREA.

A large genus of annual and perennial herbs of very diverse habit. Involucre globose or oblong; bracts imbricated, scarious, fringed, toothed, or spinous. Receptacle bristly. Florets all tubular, the outer ones often larger and neuter; lobes 5, narrow. Achene flattened; pappus short and bristly, rarely none. There are upwards of 200 species, the greater part of which inhabit

the countries bordering the Mediterranean Sea. *C. nigra*, Knapweed or Buttonweed, is a familiar native example. The name is of classical origin. We must limit ourselves to a small selection.

Annual Species.

1. *C. Cyànus.* Cornflower.—This handsome species is commonly seen in our corn-fields, where its bright blue flower-heads are highly attractive. It grows from 2 to 3 feet high, bearing numerous terminal stalked flower-heads. Leaves linear, entire or lobed, cottony. Under cultivation this species has produced white, pink, and purple varieties.

2. *C. Americàna* (fig. 149).—A very ornamental species,



Fig. 149. Centaurea Americana. (¼ nat. size.)



Fig. 150. Centaurea Babylonica. ($\frac{1}{10}$ nat. size.)

about 3 or 4 feet high. Flower-heads very large, lilac-purple. A native of the southern United States.

C. depréssa is a blue-flowered branching species about 18 inches high ; and *C. moschàta*, Sweet Sultan, and *C. Amberbòï*, Yellow Sultan, are Eastern species, the latter with pale yellow and the former with purple or white agreeably scented flower-heads. These two species are also sold under the name *Amberbòa.*

Perennial Species.

3. *C. Babylónica* (fig. 150).—This attains a height of 6 feet or more, and is clothed with a white cottony down. Flower-heads yellow, appearing in July. Levant.

4. *C. Ragusìna.*—This is a frutescent species with silver-white pinnate foliage, now very common in gardens, where it is employed for contrasting with bright-flowered bedding plants. The yellow flower-heads are of medium size and very pretty. But it is for the foliage mainly that this and some allied species are cultivated. Amongst these we may mention, *C. dealbàta* ; *C. candidíssima*, syn. *C. Cinerària*, with leathery pinnate leaves having a large terminal rounded lobe ; and *C. Clementei.* Other perennial species occasionally seen are *C. macrocéphala* with simple stems and immense solitary yellow flower-heads ; and *C. orientàlis*, a more branching plant with yellow flower-heads.

A few other species of this group worthy of a place in a large garden are: *Cárthamus tinctòrius*, Safflower, a rigid erect annual with leafy involucres and orange-red florets; *Cárduus Mariànus*, Blessed Thistle, a more familiar plant, having spiny leaves veined with white and drooping purple flower-heads ; *Sónchus macránthus*, *Onopórdon Acánthium*, *O. hórridum*, and *O. Taùricum*, and *Cárduus àfer*, perennials of large size, prickly foliage, and large purple flower-heads.

Sub-Order II.—Labiatiflòræ.

Fertile or unisexual florets 2-lipped. We have no really hardy species belonging to this division, but there are two or three Chilian species of recent introduction which may be regarded as nearly so. *Mutísia decúrrens* and *M. speciòsa* are climbing plants with pinnatifid leaves terminating in a tendril, and orange or red flower-heads on long peduncles. *Proústia pyrifòlia*, another climbing species, is remarkable for its beautiful rosy pink pappus.

Sub-Order III.—Liguliflòræ.

Florets all ligulate. Juice usually milky.

43. CATANÁNCHE.

This genus is remarkable in this division for its scarious involucre and scaly pointed pappus. There are only two species described. The name is an altered form of the Greek *κατανάγκη*, from its reputed aphrodisiacal properties.

1. *C. cærùlea* (fig. 151).—A perennial of straggling habit with handsome blue or blue and white flower-heads. A native of the South of Europe.

2. *C. lùtea.*—This is an annual species about a foot high with yellow flower-heads. Native of Candia.



Fig. 151. Catananche cærulea. (¼ nat. size.)

44. TÓLPIS.

Involucral bracts very long and slender, as well as those on the upper portion of the peduncle. Pappus of the outer florets toothed, and the inner awned. There are about six annual species, natives of the South of Europe.

1. *T. barbàta.*—This is an old inhabitant of the flower-garden. It is of rather straggling habit, bearing yellow flower-heads with a purple centre.

Crèpis rùbra, syn. *Bœrkhaùsia rùbra*, is a South European annual with tufted radical leaves and rosy or white flower-heads.

Hieràcium aurantìacum is one of the very few Hawkweeds deserving of a place in the garden. It is a creeping herbaceous plant with erect one-headed peduncles of orange-yellow flowers.

Order LXII.—CAMPANULÀCEÆ.

(Including *Lobeliàceæ*).

Herbs, rarely frutescent; juice milky. Leaves alternate, exstipulate. Calyx-limb 5-cleft. Corolla epigynous, regular or irregular. Stamens 5, epigynous or epipetalous; anthers free or combined. Ovary 2- or more celled, inferior or half superior; stigma surrounded by hairs or naked. Fruit a berry or capsule, dehiscing in pores or valves above or below the calyx-limb, many-seeded. Seeds minute, often pitted, albuminous. There are upwards of 50 genera and 800 species included in this order. The *Campanulàceæ* proper are mostly found in temperate countries of the North, and the *Lobeliàceæ* in tropical or sub-tropical regions.



Fig. 152. Campanula pyramidalis. (¼ nat. size.)

1. CAMPÁNULA.

Perennial or more rarely annual or biennial herbs with blue or lilac or white flowers having a regularly lobed corolla and free anthers. This genus contains about 200 species. The name is from the Latin, and signifies a little bell, here applied in reference to the shape of the flowers. There are several native species, including one little gem seldom seen in cultivation, namely, *C. hederàcea*, a small creeping species found in boggy places.

1. *C. pyramidàlis* (fig. 152).—A very pretty though rather

tender species with bright blue or white rather shallow corollas. It grows 3 or 4 feet high, with tufted ovate radical leaves and erect spikes of numerous flowers nearly 2 inches in diameter. A native of the mountains of South Europe, blooming towards the end of Summer.

2. *C. Mèdium* (fig. 153). Canterbury Bells.—A biennial species growing from 2 to 3 feet high, and remarkable for the large size of its flowers, which are constricted at the mouth. This is, or rather was, one of the commonest and most esteemed of garden plants. The typical form has blue flowers, but there are single and double white varieties, and, what is more remarkable, double and single rose-coloured varieties, in cultivation. Central Europe.



Fig. 153. Campanula Medium. (¼ nat. size.)

3. *C. latifòlia.*—A perennial 3 to 4 feet high, and the handsomest of our indigenous species. Leaves ovate-lanceolate, acute. Flowers large, blue or white, solitary in the axils of the upper leaves, forming a terminal raceme. This species is commoner in Central Britain and Ireland than in the extreme north and south.

4. *C. Trachèlium.*—Another native perennial species near the last, but differing in its hispid petiolate coarsely-toothed Nettle-like leaves, the lower cordate at the base, and rather smaller flowers, two or more together in the axils of the leaves. The flowers are commonly blue, and there are both blue and white single and double varieties in gardens. This is common in the South of England, extending as far northward as Forfarshire in Scotland. It comes into flower in September about the time the last is over.

5. *C. glomeràta* (fig. 154).—This species has about the same distribution as the last, excepting that it is rare in the South of England. The clustered sessile flowers distinguish it from others in cultivation. Perennial, flowering in Autumn.

6. *C. nóbilis.*—A Chinese perennial species remarkable for the large size of its reddish violet or white or cream-coloured spotted flowers, which are 3 inches or more in length. It rises to a height of 18 inches or 2 feet. Leaves hairy; lower petiolate, ovate, toothed; upper lanceolate.



Fig. 154. Campanula glomerata. (½ nat. size.)

7. *C. persicifòlia.*—A perennial species with linear serrulated coriaceous leaves and hemispherical blue or white flowers 2 to 2½ inches in diameter. One of the commonest and handsomest of cultivated species, including some handsome double-flowered varieties. It grows from 2 to 3 feet high, and continues blooming from June till September. A native of the South of Europe.

8. *C. rotundifòlia.* Hare-bell.—A common indigenous species, owing its specific name to the fact of its lower leaves being rotundate or ovate in outline. The stem-leaves are linear and entire. Stem slender, from 1 to 2 feet high, bearing a few-flowered raceme of drooping flowers on slender pedicels. The graceful habit of this plant renders it equally attractive with the larger flowered species. There are white and pink varieties, but the ordinary blue one is perhaps the handsomest.

9. *C. grandiflòra* (fig. 155), syn. *Platycòdon grandiflòrus.*—A perennial species about a foot high, of straggling habit. Flowers deep dark blue, appearing in July. Native of China.

10. *C. Carpáthica* (fig. 156).—A tufted perennial usually about 9 inches high. Leaves cordate, toothed. Flowers hemispherical, on long slender pedicels. There are several varieties of this desirable species in cultivation, with blue, blue and white, or entirely white flowers. This is perhaps the best of the dwarf species.

11. *C. Gargánica.*—An elegant little species with slender stems barely exceeding 6 inches in height. Flowers drooping, pale blue and white, funnel-shaped, with deep narrow lobes; pedicels very slender. Leaves ovate or cordate, toothed. A native of Southern Italy, flowering from June till August.



Fig. 155. Campanula grandiflora. (¼ nat. size.)



Fig. 156. Campanula Carpathica. (¼ nat. size.)

C. speciòsa is a handsome hairy species near *C. glomeràta*, with the corollas of a darker tint within; *C. pùmila* is a very diminutive species with deeply campanulate white or blue flowers; *C. rapunculoìdes* is an indigenous plant 1 to 2 feet high with large blue flowers having the corolla lobes recurved.

Phyteùma is an allied genus having a rotate corolla with narrow linear lobes, free anthers, and the flowers usually in dense heads or spikes. *Ph. orbiculàre*, a native species, found only on the chalk downs of the South; flowers deep bright blue, in dense terminal heads. *Ph. spicàtum*, a very local Sussex species, with creamy white flowers in elongated spikes.

Ph. campanuloìdes has racemose blue flowers. *Jasìone* differs from the foregoing in having connate anthers. *J. perénnis* and *J. montàna*, Sheep's-bit, are dwarf blue-flowered plants of no great beauty, the latter being indigenous.

Symphiándra péndula is separated from *Campánula* on account of the broad hairy filaments and connate anthers. It is an herbaceous plant about 18 inches high with large drooping creamy white flowers. Caucasus.

2. SPECULÀRIA.

A small genus of annual plants sometimes united with *Campánula*; but the corolla is rotate, filaments flat and hairy, and the capsule fusiform or prismatic. *Speculum* is the Latin equivalent of looking-glass, and is employed to designate these herbs on account of their bright corollas. *S. hỳbrida* is a small cornfield weed, bearing inconspicuous lilac-blue flowers.

S. specùlum, syn. *Prismatocárpus*. Venus's Looking-glass.—A slender branching plant about 6 or 8 inches high with linear leaves and reddish-violet, lilac, or white flowers about an inch in diameter. The calyx-lobes are linear, and exceed the corolla in length. A hardy little annual producing its pretty flowers in great profusion. It is a native of the South of Europe.

3. LOBÈLIA (including *Tùpa*).

Annual or perennial herbs with alternate leaves and racemose flowers. Corolla irregular, slit down the upper or posterior side; lobes unequal, the 2 upper erect or recurved, the 3 lower straight or recurved. Stamens epipetalous; anthers connate, all or only two of them bearded. Capsule half-superior, and opening through the cells. There are 200 species of this genus, occurring in temperate and tropical regions, but chiefly in the latter. There are two native species, both very rare: *L. Dortmànna*, an aquatic with cylindrical bifistular leaves and racemose spikes of blue flowers; *L. ùrens* is a less showy plant, found on heaths near Axminster. This genus was named in honour of Lobel, a physician and botanist of the time of James I.

1. *L. Erìnus* (fig. 157).—This and its varieties are usually treated as annuals, though it is said to be perennial. There are many handsome varieties much in request for edging beds, borders, etc. Some of the varieties in cultivation are the offspring of *L. bìcolor* and *L. campanulàta*, or, perhaps, crosses

between them. The flowers are some shade of blue or blue and white combined, or wholly white. They are all from the Cape of Good Hope.



Fig. 157. Lobelia Erinus. (½ nat. size.)

L. cardinàlis, *splèndens* and *fúlgens* are Mexican perennial species of erect habit from 2 to 4 feet high, bearing terminal spikes of scarlet velvety flowers. The leaves are lanceolate and slightly toothed and often tinged with red. There are many hybrid varieties or simple variations of these magnificent plants in cultivation, but unfortunately they are somewhat tender. *L. amœna* is another North American species, having blue flowers in a one-sided spike. *L. Tùpa* and *L. ignéscens* are sometimes separated with some other species under the name of *Tùpa*, on account of the persistent 5-lobed deflected corolla, the segments of which are joined at the tip. They are handsome herbaceous plants 3 or 4 feet high with bright scarlet flowers. The former is a Chilian and the latter a Mexican species; both are tender, and very rarely seen except in botanical gardens.

Order LXIII.—ERICÀCEÆ (including *Vaccíneæ*).

Shrubs or trees, usually evergreen. Leaves simple, alternate, opposite or whorled, exstipulate. Flowers regular, hermaphrodite. Calyx superior or inferior; limb 4- or 5-lobed. Corolla campanulate or urceolate, lobes imbricate. Stamens 4 to 10, hypogynous or epigynous; anthers 2-celled, opening by terminal pores, often furnished with an awn-like appendage. Disk annular, lobed, or glandular. Fruit a berry or capsule, 3- to 5-celled; cells many- or 1-seeded; seeds small. There are about 75 genera and 1,000 species, mostly from temperate and cold climates. *Pỳrola*, Wintergreen, is an herbaceous genus represented in Britain by three or four species of tufted herbs with radical leaves and terminal racemose spikes of small flowers in which the petals are free or nearly so.

Tribe I.—*VACCÌNEÆ*.

Fruit inferior; stamens epigynous.

1. VACCÍNIUM.

Erect or procumbent shrubs. Leaves alternate; buds clothed with scales. Flowers small, solitary or racemose, white or red. Corolla campanulate or urceolate. Stamens 8 to 10; anther-cells with tubular tips. Berry 4- or 5-celled. There are about 100 species in temperate Europe, Asia, and America, and three species are natives of Great Britain, *V. Myrtíllus*, Whortleberry or Bilberry, being the commonest. This has angular stems, deciduous ovate toothed leaves, and solitary pink and white flowers, succeeded by glaucous bluish-black berries. *V. Vitis-Idæa*, Cowberry, has pubescent stems, evergreen leaves, racemose flowers, and red berries. It is rare in the central counties of England, and absent from the South. *V. uliginòsum* is a northern species of procumbent habit with glabrous stems, entire leaves, pink flowers, and dark blue berries. *Oxycóccos palùstris*, Cranberry, is sometimes united with *Vaccínium*, but differs in having a rotate corolla with reflexed lobes. It is remarkable for its slender thread-like branches and small leaves. The flowers are small and drooping, and the berries red. The origin of the name is not explained. Some of the North

American species are rather more showy than the indigenous, though none are very attractive. *V. amœnum*, syn. *corymbòsum*, has much the habit of *V. Myrtillus*, with reddish flowers about 6 lines long.

Oxycóccos macrocárpus is the American Cranberry, so extensively cultivated for its fruit.

Tribe II.—*ERÌCEÆ.*

Fruit superior; stamens hypogynous.

2. ERÌCA.

Branching wiry shrubs. Leaves opposite, alternate or whorled, rigid, very small, usually having their margins revolute. Flowers in axillary or terminal racemes or umbels, tetramerous. Stamens 8; corolla persistent; anther-cells awned. Capsule 4-celled, opening through the cells, many-seeded. The name is of classical origin. This genus contains probably 500 species, the greater number occurring in South Africa. *E. arbòrea*, of Southern Europe, attains the dimensions of a small tree. *Callùna vulgàris*, syn. *Erìca vulgàris*, Ling or Heath, is distinguished from this genus by the deeply 4-partite corolla, shorter than the coloured calyx, and the capsule dehiscing between the cells. It is one of our commonest species, having short thick trigonal leaves and purple or white axillary flowers. This is the only Heath that extends to North America, and even this is very rare. There are two common British species of *Erìca* proper, namely, *E. Tétralix*, Cross-leaved Heath, having 4 hairy leaves in a whorl, and the rosy pink or white flowers in umbels; and *E. cinèrea*, Scotch Heather, with 3 glabrous leaves in a whorl, and numerous reddish purple whorled flowers in long racemes. This is a very common species, rising to a height of 3 or 4 feet in some localities. There are several varieties of these, as well as of the *Callùna*, in cultivation, including one of the latter with double flowers. Besides the above there are three other indigenous species, but they are very local. The following are some of the hardy exotic species.

1. *E. cárnea*, including *E. herbàcea*.—This is one of the most desirable species on account of its early flowering season, which begins in January or February. It is a distinct very dwarf plant with linear-acute leaves and rather long urceolate

slightly-lobed corollas narrowest at the mouth and projecting anthers. Flowers on distinct axillary pedurcles. There are purple, pink, and white flowered varieties. South of Europe.

2. *E. Mediterrànea.*—Another early-blooming species, though not so early by two months as the preceding. An erect shrub about 2 feet high. Leaves linear-acute, revolute. Flowers pink, axillary, on short peduncles. Corolla ovoid, the small lobes spreading. Anthers slightly projecting. *E. Hibérnica*, a plant found in Mayo and Galway, is referred to this species.

3. *E. vàgans.*—This species is found in some parts of Cornwall, but nowhere else in Great Britain. An erect shrub from 1 to 3 feet high, densely clothed with linear glabrous leaves. Flowers pink, purple or white, on long peduncles, in dense axillary clusters; corolla campanulate; anthers partially exserted. The only other native species, *E. ciliàris*, has ciliate glandular leaves 3 or 4 in a whorl, flowers in a one-sided raceme. The corolla is ovoid, and the anthers included and awnless. It occurs in Dorset and Cornwall, and in Galway.

E. arbòrea and *E. scopària*, together with some other South European forms, are erect-growing shrubby kinds 3 to 6 feet or more high. *E. codonoìdes*, syn. *E. polytrichifòlia*, very near and perhaps a variety of *E. arbòrea*, is one of the hardiest and freest of this set. It is a slender much-branched shrub with small pale green leaves and numerous many-flowered racemes of small white and pink flowers produced in early Spring.

3. MENZIÈSIA (*Phyllódoce, Dabeòcia*).

Heath-like shrubs. Leaves scattered, small. Flowers in terminal racemes, blue or pink or white. Corolla deciduous, ovoid, 4- or 5-lobed. Stamens 8 or 10. Capsule splitting between the cells. There are or were two species found within the United Kingdom, and several in North America. The genus was named in honour of Menzies, the naturalist of the Vancouver expedition.

1. *M. cærùlea*, syn. *Phyllódoce taxifòlia.*—A handsome little evergreen shrub having crowded linear glandular-toothed leaves green on both surfaces and lilac-blue flowers. This is sometimes separated on account of the pentamerous arrangement of the parts of the flowers. A very rare British plant, found also in other parts of Northern Europe, and in America and Asia.

2. *M. polifòlia*, syn. *Dabeòcia*. St. Dabeoc's Heath.—A dwarf straggling viscid shrub, the flowering branches alone erect. Leaves ovate to linear, silvery beneath. Flowers tetramerous, pedicellate, about 6 lines long, white or pink. There are several other varieties of this elegant little shrub in cultivation, differing in foliage and colouring of the flowers from white to deep purple. A native of Ireland and South-western Europe generally, flowering in June or July.

M. empetrifòlia and *M. globulàris* are North American species: the former dwarf with narrow leaves and rosy purple flowers; and the latter about 3 feet high with ovate leaves clustered at the ends of the branches and drooping pink flowers.

4. ANDRÓMEDA.

Shrubs or small trees of variable habit and foliage. Buds clothed with scales. Calyx-lobes valvate. Corolla ovate or campanulate, deciduous. Stamens 10; anthers with or without awns. Capsule 5-celled, dehiscing through the cells. This genus as here limited includes a considerable number of species inhabiting Europe, Asia, and North America. But it has been subdivided into several genera, including the names *Cassiopèa*, *Cassándra*, *Leucothòë*, etc.

1. *A. polifòlia.*—This is an indigenous species, and the only one of the genus according to some botanists. It is a procumbent shrub with small lanceolate acute coriaceous shining leaves having the margins recurved and glaucous beneath. Flowers small, globose, umbellate, pink or white, produced all the Summer. A widely distributed species varying considerably in its foliage and flowers. *A. Canadénsis*, *A. rotundifòlia*, *A. rùbra*, *A. rosmarinifòlia*, etc., are American varieties.

2. *A. tetrágona.*—A beautiful little shrub about 6 inches high. Leaves scale-like, imbricated, and closely appressed to the branches. Flowers pendulous, globular, white, appearing in April. A native of Lapland.

3. *A. Mariàna.*—A dwarf branching shrub about a yard high. Leaves oval. Flowers white, in pendent clusters from the old wood. Corolla tubular; calyx brown. A native of North America, flowering in Summer.

4. *A. calyculàta.*—An undershrub about 18 inches high with lanceolate or elliptical leaves and urceolate white or pinkish flowers produced in great abundance in the axils of the upper leaves. The specific name refers to the two small bracts

at the base of the calyx. A native of Newfoundland, flowering in Spring.

A. speciòsa, *axillàris*, *salicifòlia*, and *multiflòra* are the names of other species rarely seen in gardens.

5. GAULTHÈRIA.

A large genus of evergreens from the most distant parts of the globe. Flowers white or red, axillary or racemose. Calyx often fleshy, enlarging after the expansion of the flowers. Corolla urceolate, the small lobes slightly recurved. Stamens 10. Fruit 5-celled, splitting through the back of the cells, enclosed in the fleshy calyx. Named in honour of a Canadian physician.

1. *G. procúmbens.*—A diminutive plant, usually less than 6 inches high. Leaves lanceolate, serrate. Flowers white, pendulous, axillary. Fruit scarlet, edible.

2. *G. Shállon.*—A shrub 3 or 4 feet high. Leaves nearly sessile, ovate-cordate, acute, ciliate, serrate. Flowers white. Fruit purple. Both this and the foregoing species are from North America, and produce edible fruit known under various names.

Epigæa rèpens is a trailing evergreen from North America having sweet-scented white or pink flowers.

Pernéttya mucronàta, *speciòsa*, and *angustifòlia*, natives of the extreme South of America, are small evergreen shrubs having narrow coriaceous leaves and white pendulous flowers distinguished by the ten glands which alternate with the stamens.

6. ÁRBUTUS.

Evergreen shrubs or small trees. Leaves alternate, entire or serrate. Flowers white or pink, in terminal racemose bracteate panicles. Corolla globose or campanulate, with small reflexed lobes. Stamens 10, inserted on the base of the corolla; anthers opening by pores, furnished with two deflexed awns. Fruit an indehiscent 5-celled globular granular or smooth berry; cells 4- to 5-seeded. There are about a score of species in northern temperate regions, including the mountains of Mexico. The name is the old Latin one for the common species.

1. *A. Unèdo.* Strawberry Tree.—A small tree from 10 to 20 feet high. Leaves ovate-lanceolate, doubly serrate. Flowers numerous, white, appearing in September or October. Fruit scarlet, ripening the second year. This fine evergreen is found

about the lakes of Killarney, in Ireland, and the West and South of Europe generally.

2. *A. Andráchne.*—A Mediterranean species, larger in all its parts, having laurel-like leaves and smooth berries. The bark of this is of a reddish tinge and deciduous, peeling off in slender strings. There are some hybrid varieties between this and the foregoing of intermediate character.

A. prócera is a North American species requiring protection. It is closely allied to the last, but with serrated leaves and a smaller racemose panicle of white flowers. *A. Croómii* is another of the large-leaved group.

Arctostáphylos alpìna, Bearberry, is an indigenous dwarf branching shrub. Leaves deciduous, spathulate, toothed, net-veined. Flowers small, white. Fruit a drupe, containing 5 to 10 1-seeded stones.

Bryánthus eréctus is a charming Heath-like shrub about a foot high, having pentamerous broadly-campanulate red flowers. It was formerly supposed to be of hybrid origin between *Rhododéndron Chamæcístus* and *Menzièsia cærùlea*; but it is now known to be a native of Siberia, and has probably no more title to be called a hybrid than any other wild plant.

7. RHODODÉNDRON.

Shrubs or trees with few exceptions evergreen. Flowers showy, funnel-shaped, or irregularly 5-lobed. Stamens usually 10, and declinate. Flower-buds clothed with leafy scales. Fruit capsular, splitting between the cells; seeds numerous. There are two or three North American species, several alpine and arctic in Europe and Asia; but they are found in the greatest numbers in the mountains of India. The name is of Greek derivation, signifying Rose-tree.

1. *Rh. ferrugíneum.* Rose of the Alps.—A dwarf compact shrub about 2 feet high. Leaves oblong-lanceolate, glabrous above, rusty-scaly beneath. Flowers about $\frac{3}{4}$ inch in diameter, rosy-red, in terminal clusters. From May to July.

2. *Rh. hirsùtum.* Rose of the Alps.—Very much like the preceding, but the elliptical leaves are minutely toothed and ciliated, and furnished with resinous dots below.

3. *Rh. ciliàtum.*—A very handsome and distinct species clothed with hispid hairs. Leaves oblong-lanceolate, ciliate, scaly below, slightly coriaceous. Flowers large, campanulate, delicate rosy-pink and white. A Sikkim species of which there are several fine varieties.

4. *Rh. Caucásicum.*—A small shrub about a yard high. Leaves obovate or lanceolate. Flowers campanulate, white within, rosy-pink outside, and spotted with green in the throat. This grows at a great elevation in the Caucasus Mountains, is perfectly hardy, and has produced several varieties superior in beauty to the typical form. The following are some of the best varieties, or perhaps, in some instances, hybrids, of this species: *Prince Camille de Rohan*, with large white undulated corollas finely spotted with brown; *stramíneum*, clear pale yellow; *pulchérrimum*, rose; and *álbum*, white.

5. *Rh. Pónticum.*—This is the common species of gardens, having, in the ordinary variety, pale purplish-violet spotted flowers. It is the hardiest of all the large-flowered ones, and less exacting in regard to soil and situation, and the one generally employed as a stock for grafting the tenderer kinds upon. In favourable situations it will attain a large size for a bush, occasionally a height of 20 feet with a corresponding spread of



Fig. 158. Rhododendron arboreum. (¼ nat. size.)

branches. There are white, scarlet, pink, and purplish violet varieties, variously spotted with yellow, green or brown, and also double-flowered ones. The most remarkable in the latter category is the variety called *Vervœànum.* This species is a native of Asia Minor and the Iberian peninsula, without any known intermediate stations.

6. *Rh. arbòreum* (fig. 158).—This species is not quite hardy even in the most favoured localities of this country, but we give it a place here because it is sometimes planted, and because some of the varieties in cultivation are probably hybrids between this and other species. It forms naturally a small tree from 25 to 35 feet high, with thick leaves having revolute margins, glabrous above, and clothed with silvery scales beneath, and large clusters of beautiful scarlet flowers. Amongst the multitude of varieties and hybrids attributed to this species we may mention, *altaclarénse*, a fine hardy scarlet, said to be a hybrid between this and *Rh. Catawbiènse*. There are several wild forms referred here, as *álbum*, *puníceum*, *ròseum*, *cinnamòmeum*, etc. This species is a native of Nepal.

7. *Rh. campanulàtum*.—A small shrub from 4 to 6 feet high. Leaves elliptical, glabrous above, pulverulent and fawn-coloured below. Flowers very large, campanulate, rose or white, spotted with purple at the base of the three upper lobes. This is likewise a native of Nepal, though perhaps rather hardier than the last. There are many varieties, flowering with us in March and April, and consequently often injured by the frosts.

8. *Rh. máximum*.—A small tree from 10 to 15 feet high. Its leaves are oblong-lanceolate, slightly revolute, glabrous above, slightly pulverulent and ferruginous beneath. Flowers in dense depressed terminal clusters of medium size, campanulate, rose and white with a pale yellow blotch and purple-brown spots on the upper lobe, or wholly white. This is a very hardy species, a native of North America on the Atlantic coast from Carolina to Canada, and was introduced into Europe about the middle of the last century. The most familiar variety is *álbum*, whose flowers are of snowy whiteness. It has also furnished some good hybrids, amongst others *Dona Maria*, obtained in Belgium by crossing it with *Rh. Pónticum*. It is a superb and very hardy plant, equally desirable for the large size of its clusters and its pretty rosy flowers spotted with orange-red. The variety *Prince Camille de Rohan*, referred to above, is thought by some to be a hybrid between this and *Rh. arbòreum*, or *Rh. Caucásicum*.

9. *Rh. Catawbiénse*.—This is another North American species, originally discovered by Mr. Fraser in the neighbourhood of the source of the Catawba river in North Carolina, and introduced early in the present century. It is a bushy

shrub from 3 to 6 feet high with broadly oval flat glabrescent leaves, bright green beneath. The flowers are large, campanulate, in compact rounded clusters, pink, deep rose, or with a tinge of violet and spotted on the superior lobe. The varieties are numerous, and, as well as those of the last, very desirable on account of their flowering in Summer, when there is no danger of the blooms being injured by frost.

10. *Rh. chrysánthum.*—A very dwarf evergreen species with linear-lanceolate leaves clustered at the ends of the branches. Leaves narrowed at the base into a long petiole, ferruginous below. Flowers yellow, broadly campanulate, in small terminal clusters; petioles long. A native of Siberia, flowering in Summer.

11. *Rh. Dahúricum* (fig. 159).—A small shrub from 3 to 4 feet high. Leaves deciduous, or persistent during a part of the



Fig. 159. Rhododendron Dahuricum. (¼ nat. size.)

winter only, oval-oblong, glabrous above in the adult stage, and rusty-tomentose beneath. Flowers solitary or few together, purple or violet, appearing in February before the new leaves are developed. This is a native of the northern regions of Asia, and perfectly hardy.

In addition to the above hardy or almost hardy species there are many others of more recent introduction, generally termed Sikkim Rhododendrons, which are even more strikingly beautiful both in foliage and inflorescence; but unfortunately they are tender, requiring protection in ordinary winters. Another objection to planting them in the open ground is the early flowering season of most of the species, and consequent greater liability to injury from frost. Some of these species have tubular corollas with a rotate limb, while others have them broadly expanded and of immense size, more resembling those of a Camellia. Though these are more suitable for the temperate house, we cannot omit to notice some of the better known species.

Rh. Windsòri, a small shrub from Bootan, where it grows up to an elevation of 8,000 to 9,000 feet. Leaves coriaceous, obovate-lanceolate. Flowers from a deep purple to nearly white.—*Rh. Campbélliæ*, a tree from 30 to 35 feet high in its native country, the Sikkim Himalayas. It is very near *Rh. arbòreum*, differing in its more coriaceous leaves, which are cordate at the base and rusty beneath. The crimson spotted flowers are in dense clusters. — *Rh. argénteum*, a tree of about the same dimensions as the last, with noble foliage a foot or more in length, silvery beneath. The campanulate flowers are very large, rose or white with a purple blotch at the base. —*Rh. Falconèri*: this species is even finer than the last, if we only consider its large shining leaves, which rival those of the *Magnolia grandiflòra*; but its white flowers are comparatively small.—*Rh. Hodgsòni*, a shrub of about half the stature of the preceding, but with equally large glabrous leaves. The campanulate nearly regular rose-coloured flowers are united in clusters of fifteen to twenty, and have eight rounded lobes and about sixteen stamens.—*Rh. Nuttállii*, a noble tree attaining a height of about 25 feet, with large coriaceous oval leaves shining and glabrous above and covered with brown scales beneath. But what renders this species remarkable is the enormous size of its gorgeous flowers, which are deeply campanulate and 6 or 7 inches in diameter, white tinged with rose and bright yellow in the centre. This is perhaps the grandest of all Rhododendrons.—*Rh. Maddèni*, a shrubby species about 6 feet high with erect slender branches, which, as well as the under side of the leaves, are clothed with a rusty tomentum. The flowers are pure white, tubular, from 4 to 5

inches deep, with a spreading limb resembling those of *Lílium cándidum*. To this list might be added many more from the same region; but we content ourselves with naming one more, the *Rh. Blandfordiæflòrum*, remarkable for its tubular pendulous cinnabar and orange flowers. We must not forget to mention that several hardy Japanese species have recently been introduced: *Rh. Fortùnei* and *Rh. Metternìchii*, with oblong or obovate coriaceous leaves rusty-tomentose beneath, and corymbose heads of campanulate rose-coloured flowers.

Notwithstanding the great diversity and beauty of the wild forms of this genus, many horticulturists—notably in England —have crossed them, and thus obtained many new and distinct varieties, usually termed hybrids. For detailed descriptions of these we must refer our readers to the nursery catalogues of the principal growers.

Rhodothámnus Chamæcístus is a handsome alpine shrub from Switzerland, having oval serrate ciliate leaves and solitary rosy flowers. It is separated from *Rhododéndron* on account of its rotate corolla and spreading stamens.

Rhodòra Canadénsis, syn. *Rhododéndron Rhodòra*, is a deciduous shrub often seen in gardens, with purple sweet-scented flowers appearing before the leaves in Spring.

8. AZÀLEA.

Deciduous or evergreen shrubs. Leaves membranous, often ciliate and hairy, mucronate. Flowers large and showy, often glandular and clammy, expanding before the new leaves are fully developed. Corolla funnel-shaped. Stamens exserted, usually 5, filaments long. Botanists now unite this with *Rhododéndron* in consequence of the discovery of species intermediate in character; but it will be more convenient to keep the hardy species separate in this work, because they are so universally known under these distinctive names. The species referred here are not so numerous, but the genus has much the same range. The name is from *ἀζαλέος*, parched, in allusion to the natural habitats of some species.

Leaves Deciduous.

1. *A. Póntica.*—This species is a native of Asia Minor, and ordinarily grows from 3 to 6 feet high, with lanceolate soft hairy leaves and yellow or orange flowers sometimes tinged with red.

2. *A. calendulàcea.*—A North American species of about the same stature. Leaves obovate-oblong, hairy. Calyx-lobes oblong. Tube of the corolla shorter than the lobes, hairy. Flowers large, numerous, orange-coloured.

3. *A. nudiflòra.*—Near the last in characters, and from the same regions. Corolla-tube glandular, scarcely exceeding the broad lobes. The flowers vary from pink to deep purple. Both flower in Spring.

A. viscòsa and *A. arboréscens*, North American species, produce the flowers before the leaves, the former having a long tube to the corolla, and the latter being quite smooth in all its parts.

The foregoing forms, in conjunction with *A. viscòsa* and *A. speciòsa*, and perhaps some other species or wild varieties whatever they may be, have given birth to the numerous varieties now in cultivation, partially from natural variation and partially by intercrossing. In colour they range from white through every shade of yellow, orange, and red to crimson, and many uncommon intermediate tints. There are also hybrid forms between some of these and the true Rhododendrons,



Fig. 160. Azalea Indica. (¼ nat. size.)



Fig. 161. Azalea liliiflora. (⅛ nat. size.)

especially between *Rh. Pónticum* and *A. Sinênsis*, syn. *A. móllis*, a species very near *A. Póntica*, with larger yellow or orange flowers and elliptical leaves. The hybrid called *Rh. præcox supérbum* has flowers in the shape of an *Azàlea*, of a lilac colour, and very small dark green persistent leaves.

Leaves Persistent.

The species belonging to this division are not so hardy as the foregoing, and usually treated as greenhouse plants. They are usually of smaller more compact growth. The Indian Azaleas have sprung from *A. Índica* (fig. 160), and some other species or natural varieties introduced from China. Some of these forms, as *A. liliiflòra* (fig. 161), are said to be quite hardy.

9. KÂLMIA.

Evergreen shrubs usually of small stature and compact habit. Leaves alternate, entire. Flowers solitary or corymbose, hemispherical or broadly campanulate. This genus is remarkable for having projecting cavities in the corolla holding the stamens until they are mature, when the slightest touch of the filaments will release them and cause the anthers to discharge their pollen. There are about half-a-dozen species, all natives of North America. This genus was named in honour of a Swedish botanist.

1. *K. latifòlia* (fig. 162). Calico Bush, Mountain Laurel.—This is the handsomest of the group, having shining alternate foliage of a pleasing verdure, and dense clusters of exquisitely elegant delicate pink, rose or nearly white flowers, produced from May to July.



Fig. 162. Kalmia latifolia. (⅓ nat. size.)

2. *K. angustifòlia.* Sheep Laurel or Lambkill.—In this species the leaves are usually opposite or in threes, and narrower, and the flowers are of a deeper colour and smaller, than in the last.

3. *K. glaùca.*—A straggling shrub with compressed 2-edged branches and nearly sessile glaucous leaves with revolute margins. Corymbs few-flowered; flowers lilac-purple, produced in April. *K. hirsùta* has hairy leaves and solitary axillary rosy flowers. This shrub grows about a foot high.

10. LÈDUM.

Small shrubs with evergreen revolute bullate leaves rusty-tomentose beneath and terminal clusters of small white or pinkish flowers. This genus is distinguished by having a corolla of 5 separate petals and 5 stamens. The few species known are found in swampy bogs of Europe, Asia, and North America.

1. *L. palústre.*—This is the common European species, growing from 2 to 3 feet high. Leaves distant, narrow, revolute, distinctly petiolate.

2. *L. latifòlium.*—An American plant very similar to No. 1, but the leaves are oval or oblong, and scarcely recurved at the margin, and the flowers are more numerous. Both bloom in Spring.

Order LXIV.—STYRACÀCEÆ.

Shrubs or trees having simple alternate usually toothed exstipulate leaves and regular hermaphrodite flowers. Calyx free or adherent to the ovary. Corolla of 4 to 8 more or less united petals, often differing in number from the calyx-lobes. Stamens double the number of the corolla-lobes or frequently more. Fruit drupaceous, or dry and winged, included in the calyx-tube or inferior, 1- to 5-celled; cells usually 1-seeded; seeds albuminous. A small group of about six genera and upwards of a hundred species, best known in gardens by the Snowdrop trees. The majority of the species are from the tropics of America and Asia.

1. HALÈSIA.

Deciduous shrubs or small trees with petiolate venose leaves and pure white flowers on slender drooping pedicels, solitary or in small clusters from the buds of the preceding year. Calyx-tube adherent to the ovary, surmounted by 4 small teeth. Petals 4, united to about the middle in a bell-shaped corolla. Stamens 8 to 16, united in a ring at the base of the corolla. Fruit dry, 2- to 4-winged, with 1 to 4 bony 1-seeded cells. There are only three or four species, all limited to North America. This genus commemorates the celebrated Dr. Hales, author of 'Vegetable Statics,' etc.

1. *H. tetráptera.* Common Snowdrop Tree.—This is the species commonly cultivated. It is distinguished by its 4-winged fruit, which is from 1 to 2 inches long. The flowers somewhat resemble in size and outward appearance those of the common Snowdrop. They are produced in April or May before the leaves have attained their full development. This and the other species are popularly known under the name of Silver-bell trees. *H. díptera*, as the name indicates, has usually a 2-winged fruit; and *H. parviflòra* is a species with smaller flowers.

Stŷrax officinàlis, which furnishes the Storax of the shops, is a native of Asia Minor and South of Europe, and is occasionally seen in English gardens, but being rather tender it is comparatively rare. It is a small deciduous shrub in this country, with ovate leaves shaggy beneath, and racemes of white flowers about an inch or a little more in diameter. The fruit is spherical, usually 1-celled by abortion, and enclosed within the calyx-tube. There are besides the above three or four hardy North American species very desirable on account of the profusion of their showy white flowers, but they are almost unknown in this country. The foliage is more or less clothed with a stellate or scurfy indumentum.

The genus *Sýmplocos* comprises many species, chiefly from the tropical and warmer parts of Asia and America. It is characterised by having a 5-lobed calyx adhering to the base of the ovary, 5 petals slightly combined at the base, and very many stamens in several series. The flowers too are yellow, and the pubescence not stellate. *S. Japónica* is a Japanese shrubby species of recent introduction; and *S. tinctòria* is a very fragrant North American species known under the names of Sweet-leaf and Horse-sugar, from the fondness evinced by animals for browsing upon its sweet foliage.

Order LXV.—EBENÀCEÆ.

Hard-wooded trees or shrubs with simple alternate entire exstipulate leaves and inconspicuous regular polygamous axillary flowers. Calyx free, 4- to 6-lobed. Corolla 4- to 6-lobed. Stamens 8 to 16. Fruit in the following genus a large globular several-celled berry; cells containing 1 large flat shining albuminous seed. A small order comprising

about 150 species, chiefly tropical, a few occurring in China and Japan and North America, and one in Europe.

1. DIOSPŸROS.

This genus is by far the most numerous in species of any in the family. Ebony and several other valuable and handsome woods are furnished by this genus, and several species produce edible fruit. The name is from Διός, Jove's, and πυρός, grain or food, literally heavenly food.

1. *D. Virginiàna.* Persimmon.—A small tree with somewhat coriaceous persistent leaves and small greenish yellow diœcious flowers succeeded by yellow edible roundish fruits about 1 inch in diameter. This is somewhat tender, but on well-drained soils it will withstand our winters, though it rarely ripens its fruit with us. There is a specimen about 30 feet high in the arboretum at Kew. North America.

D. Lòtus is the only European species. It has oblong acuminate leaves reddish beneath and purplish flowers.

D. Kàki, the Date Plum, is a Japanese species which produces a bright red edible fruit as large as a small apple.

Order LXVI.—JASMÌNEÆ.

Evergreen or deciduous shrubs often of trailing habit. Leaves opposite or rarely alternate, trifoliolate, pinnate or reduced to a single leaflet articulated with the petiole. Flowers often highly odoriferous, yellow or white. Calyx inferior, 5- to 8-lobed; lobes twisted or valvate in æstivation. Stamens 2, inserted upon and included within the tube of the corolla. Fruit a bilobate 2-celled berry or capsule; cells 1- or few-seeded. There are about 6 genera and 100 species, widely dispersed throughout the world except North America, but especially abundant in Asia.

1. JASMÌNUM.

This is the only genus of the order coming within our province. It is characterised by having a succulent fruit. The species occur in Europe, Asia, Africa, South America, and Australia; and the name is an altered form of an Arabic word signifying fragrant.

1. *J. officinàle.* Common White Jessamine.—This beautiful

plant is deservedly a great favourite, though not so universally planted as it should be. Branches angular, slender, and flexible, deep green. Leaves opposite, deciduous, pinnate; leaflets lanceolate, acuminate. Flowers white, very fragrant, produced from June till September. A native of Northern India and China, and now naturalised in the South of Europe. There are variegated and double-flowered varieties, but none superior to the common one.

2. *J. frùticans.*—An evergreen more erect-growing species with alternate trifoliolate or unifoliolate dark green shining leaves and yellow flowers appearing in July or August. South of Europe.

3. *J. hùmile.*—Another South European species near the last, but of smaller stature and humbler growth. Leaflets three or more, ovate-oblong, acute. Flowers yellow, in Summer.

4. *J. nudiflòrum* (fig. 163).—This deciduous species is



Fig. 163. Jasminum nudiflorum. (¼ nat. size.)

remarkable for its numerous solitary opposite yellow flowers, which are produced throughout the length of the flexible green

branches from November onwards through the Winter. Leaves small, ternate. A native of China. There is a variety with golden leaves.

5. *J. revolùtum.*—Branches rather stouter than in most of the foregoing. Leaves persistent, pinnate, alternate, of a dark glossy green. Flowers fragrant, bright yellow, borne in large terminal clusters. A native of Northern India, blooming all the Summer.

J. Wallichiànum, *J. pubígerum*, and *J. heterophýllum* are yellow-flowered North Indian species less frequently seen; the latter is remarkable for the large size of its trifoliolate leaves, which are often reduced to one leaflet. *J. Azóricum* and *J. odoratíssimum* are white-flowered species from the Atlantic Islands. All of these are more or less tender.

Order LXVII.—OLEÁCEÆ.

A small order with most of the structural characters of the last, but usually of erect habit and often arborescent. It is distinguished by having simple or pinnate opposite exstipulate leaves and usually small hermaphrodite and unisexual flowers, rarely apetalous (*Fráxinus*). Calyx inferior, 4-partite. Corolla of 4 petals. Stamens 2. Fruit a drupe, berry or capsule, 2-celled or by abortion 1-celled and 1-seeded. About 25 genera and 140 species are referred here. The members of this order are most abundant in the temperate and warmer zones of the north, but isolated species are found in the tropics and southwards. The Olive, *Òlea Europæa*, is one of the most useful members of this group. *Chionánthus Virgínica*, the Fringe Tree of North America, is a very ornamental tree with large simple deciduous leaves and drooping clusters of pure white flowers having narrow fringe-like petals, and followed by purple drupes; but it is very rare in cultivation in this country.

1. PHILLYRÈA.

Evergreen shrubs or small trees with small simple glabrous serrulated leaves and inconspicuous bisexual greenish-yellow flowers borne in axillary clusters. Fruit a 1- or 2-celled 1- or 2-seeded berry. The few species known inhabit the shores of the Mediterranean. Named from φύλλον, a leaf, in allusion to the ornamental foliage.

1. *Ph. latifòlia.* — An exceedingly ornamental compact-growing shrub with cordate-ovate or oblong sharply serrulated coriaceous shining leaves. *Ph. angustifòlia* is distinguished by its linear-lanceolate nearly entire leaves; and *Ph. mèdia* by its ovate-lanceolate or oblong sharp-pointed leaves. But there are several intermediate forms in cultivation under various names; as, *ilicifòlia*, *salicifòlia*, *rosmarinifòlia*, and *oleæfòlia*, etc., which seem to indicate that the above all belong to one very variable species. Nevertheless they are sufficiently distinct to be desirable in a garden. These shrubs are especially valuable for sea-side planting.

Fontanèsia phillyreoìdes is an allied shrub resembling the common Privet in its slender branches, but with ciliate leaves and white clustered flowers. The fruit is a winged capsule like that of *Syrínga*.

2. ÒLEA (including *Osmánthus*).

The shrubs here enumerated are better known under the name *Osmánthus*, but the characters are insufficient to constitute a good genus. Leaves simple, entire or spiny-toothed. Flowers small, white or greenish yellow. Fruit a drupe. There are upwards of 30 species in the warmer parts of the Old World. *Òlea* is the ancient Latin name of the Olive, *O. Europæa*.

1. *O. ilicifòlia*, syn. *Osmánthus ilicifòlius* and *aquifòlius*. —A handsome evergreen shrub with coriaceous smooth shining oval or oblong prickly-toothed Holly-like leaves. This is very variable in regard to the size and toothing of the leaves, and there are several variegated varieties in cultivation. A native of Japan.

3. LIGŬSTRUM.

Evergreen or deciduous shrubs or trees with simple entire leaves and terminal panicles of small white flowers. Fruit a spherical 2-celled 1- or 2-seeded berry. Besides the common European species there are several from North India, China, and Japan. The name is derived from *ligare*, to bind, in allusion to the use made of the pliant shoots.

1. *L. vulgàre.* Common Privet or Prim.—Leaves linear-lanceolate or oblong, acute or obtuse. Flowers white, appearing in June. The ordinary form of this useful native shrub loses its foliage towards the end of Autumn and bears purplish black berries; but there is a variety with persistent

foliage. And there are white- and yellow-berried and gold and silver variegated varieties, as well as a weeping form.

2. *L. Japónicum.*—An evergreen robust-growing shrub with coriaceous larger and broader leaves than the foregoing and slightly fragrant rather larger flowers. There is a variety with handsome variegated foliage.

3. *L. Sinênsis.*—An evergreen or quasi-evergreen shrub with slender pubescent branches and ovate-lanceolate leaves shining above and hairy beneath. Flowers small, white. China.

4. *L. lùcidum*, syn. *L. ovalifòlium.*—A pretty evergreen shrub with oval, ovate-lanceolate, elliptical or nearly rotundate leaves and white flowers. Native of Japan, and very near and probably a variety of *L. Japónicum.*

5. *L. coriàceum.*—A very distinct evergreen species of recent introduction, with dense glossy dark green coriaceous ovate-oblong obtuse leaves.

4. FRÁXINUS (including *Órnus*).

Trees with unequally pinnate deciduous leaves and polygamous or dicœcious flowers in dense axillary clusters. Calyx 4-lobed or none. Corolla 4-lobed or none. Stamens 2. Fruit a flattened 1- or 2-celled samara or key, winged at the tip; cells 1-seeded. About thirty species are known, inhabiting Europe, North Asia, and North America, where they are most numerous. *Fraxinus* is the Latin name of the common Ash.



Fig. 164. Fraxinus Ornus. (Nat. size.)

1. *F. Ornus*, syn. *Órnus Europæa* (fig. 164). Flowering Ash.—This is so called on account of the conspicuous clustered panicles of pure white petaliferous flowers pendulous at the extremities of the branches. A handsome small tree with somewhat hairy leaves, composed of 7 to 9 pairs of lanceolate shortly petiolulate leaflets. South of Europe.

2. *F. rotundifòlia.* Manna Ash.—Very near the foregoing, but having less conspicuous flowers and more rounded sessile leaflets. South of Europe.

3. *F. excélsior.* Common Ash.—This handsome native tree differs from the above in having apetalous flowers with purplish black stamens. The smooth ash-grey bark, pinnate leaves and black buds distinguish it from all our other native trees. The Weeping Ash is a variety of this, and was first discovered in Cambridgeshire about a century since. There is also a gold-barked variety both erect and pendulous, and there are gold and silver striped and blotched varieties. The form called *monophýlla*, or *heterophýlla*, is singular in having most of the leaves reduced to a single leaflet, which is nearly entire or finely cut, as in the variety called *laciniàta.* The variety *crìspa* is more curious than beautiful, having very dark green curled foliage.

F. lentiscifòlia.—A smaller tree with long slender branches and distant leaves composed of few long narrow remote leaflets. A native of the Levant, of which there is a weeping form. *F. longicúspis* is a recently introduced Japanese tree with two or three pairs of lanceolate very acuminate leaflets.

The North American species are numerous, but offer no novelty or variety, and are only grown in collections or on a small scale for their timber, for which purpose, however, they have not proved superior to the common one.

There are many fine old trees of the common form scattered over England, some nearly a hundred feet high, notably one at Woburn and another at Cury.

5. SYRÍNGA.

Deciduous shrubs bearing simple entire leaves and large terminal clusters of usually sweet-smelling flowers. Corolla salver-shaped. Fruit a flattened 2-celled capsule, when ripe splitting into two boat-shaped pieces, each containing one or two winged seeds. Only about half a dozen species are known to exist in a wild state, and these are found in South-eastern Europe, Persia, Northern India and China. The name is said to be an altered form of the Persian *Syrinx*, which is applied to the common one.

1. *S. vulgàris.* Common Lilac.—This, with the Laburnum, forms the chief attraction of our shrubberies in Spring, and we should as soon expect to see a garden without a Lilac as with-

out a Laurel. Its origin is somewhat uncertain, though it is believed to have been brought from Persia. At all events it has been in cultivation about three centuries, and has given birth to many superior varieties either by natural variation or intercrossing with other species. The foliage in the common form is smooth, cordate-ovate, acuminate, and of a rather pale green; and clusters of flowers larger than in the other species. Amongst the many varieties now included in catalogues we may note: *Dr. Lindley*, having extremely large clusters of reddish lilac flowers; *álba*, pure white; and *violàcea*, *rùbra insígnis* and *ròsea grandiflòra*, whose names indicate the various tinges of their flowers. *S. dùbia* or *Chinénsis* is a



Fig. 165. Syringa vulgaris, var. Charles X. (¼ nat. size.)

closely allied species, if indeed it be specifically distinct. It is commonly called the Siberian Lilac, and differs in its smaller stature, narrower leaves, and more profuse inflorescence of reddish violet hue. The variety called *Rothomagénsis*, or *Lilas Varin* of the French, belongs here, and the fine variety

Charles X. (fig. 165) should probably also be referred to this race. It is remarkable for the immense size of its panicles and the beautiful colour of its flowers.

2. *S. Josikæa.*—This is a shrub of similar habit, but the ovate-lanceolate leaves are wrinkled and of a darker green, and the bluish purple flowers scentless. A native of Transylvania, blooming later than the varieties of *vulgàris.*



Fig. 166. Syringa Persica. (½ nat. size.)

3. *S. Emòdi.*—A tall shrub with warty excrescences on the stems, large oblong reticulately-veined leaves, and lilac or white flowers in erect dense panicles. A native of the mountains of India, scarcely so ornamental as the common species.

4. *S. Pérsica* (fig. 166). Persian Lilac.—This is a very distinct species of much smaller size, rarely exceeding 4 or 5 feet in height. The branches, too, are slender and straight, and the smaller ovate-lanceolate leaves are narrowed at the base. The flowers vary in colour from rosy carmine to white. And there is a variety with laciniated foliage. This blossoms in May.

6. FORSŸTHIA.

A small genus of deciduous shrubs of dwarf habit. Branches slender. Leaves simple or compound, glabrous. Flowers drooping, yellow, appearing towards the end of Winter or beginning of Spring, solitary from the axils of the previous year's leaves. Corolla 4-lobed, campanulate. The three known species are from China and Japan. Mr. Forsyth, after whom this genus was named, was gardener at Kensington Palace.

1. *F. viridíssima.*—Leaves all simple and quite entire, linear-lanceolate or oblong, acute. Flowers abundant; peduncles much shorter than the flowers, covered with small scaly bracts. Calyx-lobes oblong, obtuse, shorter than the corolla-tube. Style always (?) longer than the stamens.

2. *F. suspénsa* (fig. 167).—Leaves simple and trifoliolate on the same branch, toothed; central leaflet much larger than the lateral ones. Flowers few, scattered on the very slender branches. Peduncles slender, nearly naked, exceeding the flowers in length, bracteate at the base only; some of the bracts from 3 to 6 lines long. Calyx-lobes lanceolate, acute, equalling the corolla-tube. Style always (?) shorter than the stamens.

F. Fortùnei is a newly introduced species with simple broadly ovate leaves and golden yellow flowers.



Fig. 167. Forsythia suspensa. (½ nat. size.)

Order LXVIII.—APOCÝNEÆ.

Trees, shrubs, or rarely herbs, usually with a milky sap. Leaves simple, opposite, or more rarely alternate or whorled. Stipules none, or sometimes replaced by bristles or glands between the petioles. Flowers regular, solitary or corymbose, axillary or terminal. Calyx free, 4- or 5-lobed. Corolla hypogynous, salver-shaped or campanulate, throat naked or hairy, lobes twisted in bud. Stamens 4 or 5, inserted on the tube of the corolla; anthers connate and adhering to the stigma; stigma usually constricted in the middle. Fruits usually composed of two many-seeded follicles; capsules rarely drupoid or baccate. Seeds often winged or plumose. With the exception of the genera coming within our province, the members of this order are tropical or sub-tropical, and most numerous in Asia. There are about 100 genera and 600 species known.

1. VÍNCA.

Herbs or evergreen trailing shrubs. Leaves opposite, entire, glabrous and glossy. Flowers solitary, axillary, blue, white, or purple. Calyx 5-lobed, lobes glandular inside at the base. Corolla salver-shaped, the tube hairy within; lobes oblique. Stamens 5; anthers bearded. Disk biglandular. Carpels 2, many-seeded; seeds neither plumose nor winged. There are about 10 species, occurring in Europe, Asia, and Africa. The genus derives its name from *vincere*, to bind, the use made of the flexible branches.

1. *V. màjor.* Larger Periwinkle.—A trailing shrub with erect flowering-branches. Leaves ovate-cordate, ciliate. Flowers large and showy, bright blue, appearing in the Spring; calyx-lobes ciliate. There are several varieties, but the one called *elegantíssima*, with beautifully variegated foliage, is the best. This species is a native of Europe and North Africa, and is occasionally found as a straggler from cultivation in Britain.

2. *V. mìnor.* Lesser Periwinkle.—This is smaller in all its parts than the preceding. Leaves ovate-lanceolate or elliptical, not ciliated on the margins. It blooms about the same time. There are blue, reddish purple, and white single- and double-flowered varieties, and others with gold or silver variegated foliage. This species is frequently met with growing wild in England, though not usually considered as indigenous. It is confined to Europe.

3. *V. herbàcea.*—As the name implies this is of more herbaceous habit and less vigorous growth. The foliage, too, is less ample, and ovate or narrowly lanceolate, and rough on the margins. Flowers more abundant, with narrower corolla-lobes. A native of Hungary, flowering in Spring.

2. AMSÒNIA.

Perennial herbs with alternate leaves and terminal panicles of pale blue flowers. Corolla-lobes narrow. Anthers naked. Carpels or follicles long and narrow; seeds naked. Other characters the same as in *Vinca*. This genus consists of five or six North American species, and was named after an American traveller of some note.

1. *A. Tabernæmontàna*, syn. *A. latifòlia.*—An erect herb with ovate-lanceolate shortly-stalked glabrous leaves and terminal cymes of pale blue flowers appearing in Summer.

A. salicifòlia has a less erect habit, smaller flowers, and lanceolate leaves; and *A. ciliàta* linear leaves.

3. APÓCYNUM.

Erect perennial herbs with tough fibrous bark. Leaves opposite, mucronate. Flowers cymose, on axillary or terminal peduncles. Corolla campanulate, bearing five triangular appendages at the mouth of the tube. Fruit of two slender follicles; seeds plumose at one end. There are three North American and one South European species. The name is a compound of *ἀπό*, from, and *κύων*, a dog, supposed to be poisonous to dogs, whence the English name Dogbane.

1. *A. androsæmifòlium.* Fly-trap. — A branching herb from 1 to 2 feet high with ovate glabrous petiolate leaves and small pale red flowers in loose cymes. Corolla-tube much longer than the calyx-lobes. An interesting and curious plant remarkable for the irritability of the glutinous throat-appendages, which collapse upon intruding insects and retain them prisoners. A native of North America, flowering towards the end of Summer.

A. cannabìnum, Indian Hemp, is a variable species having several synonyms. The flowers are greenish white, and the corolla-tube does not exceed the calyx-lobes. *A. Venètum* is the European species.



Fig. 168. Nerium Oleander floribus plenis.

The Oleander, *Nèrium Oleánder* (fig. 168), is really a greenhouse plant with us, though it will exist in the open air in the South-west of England if protected in Winter. It may be well to mention that this plant, so commonly seen in windows, is excessively poisonous. There are many handsome double-flowered varieties. *Parechìtes Thunbérgii*, better known in gardens under

the name of *Rhynchospérmum jasminoìdes*, is very commonly grown in conservatories for its pure white deliciously scented flowers, and bears the popular name of Cape Jessamine, but it is a native of Japan and China. It will succeed against a south wall with slight protection in severe weather, though it does not bloom freely without the warmth of a greenhouse.

Order LXIX.—ASCLEPIÀDEÆ.

Herbs or shrubs often of twining or prostrate habit; sap usually milky. Leaves simple, opposite or whorled, rarely scattered. In habit, and to a certain extent in structure, the members of this group come very near the *Apócyneæ*, but the lobes of the corolla are commonly valvate, and the anthers and stigmas are consolidated, forming a column, and the pollen coheres in wax-like masses. This character is common to this order and the Orchids alone. The fruit is composed of two erect or divergent follicles, occasionally reduced to one by abortion; and the seeds are almost invariably plumose. There are about 150 genera and nearly 1,000 species belonging to this group. They are chiefly tropical or sub-tropical, and especially numerous in South Africa, where there are many highly curious succulent species. A few extend to the temperate regions in the North.

1. ASCLÈPIAS.

Erect herbaceous perennials; roots often fleshy. Leaves usually with conspicuous transverse veins. Flowers in simple terminal or extra-axillary umbels. Lobes of the corolla long and narrow, reflexed. Within the petals there is a coronet seated upon the combined filaments, composed of 5 boat-shaped processes having 5 projecting horns. Stamens 5, inserted upon the base of the corolla. Pollen-masses 10, waxy, fixed to the stigmas in pairs. Follicles normally 2, not coriaceous. Seeds bearing a tuft of silky hairs at one end. There are upwards of twenty-five species, mostly from America, many of which occur in the temperate regions of the North. The name is the Greek form of *Æsculapius*, to whom the genus is dedicated.

1. *A. tuberòsa.* Butterfly-weed or Pleurisy-root.—An erect hairy plant about 18 inches high. Leaves linear to oblong-lanceolate, nearly sessile. Flowers small, numerous, terminal, or towards the summit borne in corymbose umbels. Petals

green tinged with orange. Hoods of the coronet oblong, bright orange-red, and more conspicuous than the petals. Seed-vessel hoary, not prickly. A native of dry localities in North America, producing its brilliant flowers nearly all the Summer.

2. *A. Cornùti*, syn. *A. Syrìaca.* Milkweed or Silkweed.—A robust-growing leafy species from 3 to 4 feet high. Leaves large, ovate or oblong, downy beneath, and distinctly petiolate. Flowers fragrant, larger than in the preceding, dull purple; hoods of the crown ovate, with 2 lateral teeth. Seed-vessel covered with soft prickles. A native of North America only, the second name having been misapplied.

The foregoing species are the only ones at all common in gardens, but there are several others equally handsome and effective where there is ample space for large subjects. *A. Douglásii* has purplish-lilac sweet-scented flowers; *A. incarnàta* purple and flesh-coloured; *A. variegàta* purple and white.

2. PERÍPLOCA.

Twining shrubs with opposite glabrous leaves and axillary cymose flowers. Corolla rotate, having 5 awned scales in the throat; lobes spreading. Filaments not combined. Pollen-masses granular, applied separately to the stigma. A small genus, occurring in the South of Europe and tropical Asia and Africa. The name is derived from περιπλοκή, a coiling round, in reference to the habit of some species.

1. *P. Grœca.*—A deciduous twiner with rather small ovate-lanceolate leaves and purple-brown axillary clusters of flowers, appearing in Summer. A very curious and interesting plant, growing from 15 to 20 feet high. Native of Southern Europe.

Physiánthus álbicans is a showy white-flowered tender climber from South America, occasionally seen in sheltered localities.

Order LXX.—LOGANIÀCEÆ.

This is a small group agreeing with the *Rubiàceæ* or *Cinchonàceæ* in having opposite simple leaves and interpetiolar stipules and other characters, but differing in the fruit being superior. The *Nux vomica* and many other deadly poisons are produced by members of this family. The species are nearly all tropical.

1. SPIGÈLIA.

Herbs with the flowers in one-sided spikes. Corolla long, tubular, with 5 small nearly erect teeth at the top. Stamens 5. Style jointed near the middle. Fruit composed of two carpels, finally separating and bursting down the back, few-seeded. This is exclusively an American genus, embracing about thirty species, mostly from the warmer and tropical parts.

1. *S. Marilándica.* Worm-grass or Pink-root.—A handsome herbaceous plant usually growing about a foot high. Leaves sessile, ovate-lanceolate, glabrous. Flower-spike terminating the simple stems, 4- to 8-flowered, the lowermost opening first. Flowers crimson without, bright yellow within, about 1½ inch long, produced in Summer.

Order LXXI.—GENTIANÀCEÆ.

Annual, biennial, or perennial herbs, usually erect and glabrous. Leaves simple, entire, opposite or whorled (except in *Menyánthes*, where they are alternate and trifoliolate; and alternate and floating in *Limnánthemum*), exstipulate, often strongly nerved. Flowers regular, bisexual, solitary or in dichotomous or trichotomous cymes. Calyx inferior, 4- to 8-lobed; lobes valvate or contorted in bud. Corolla hypogynous, often persistent, rotate, funnel-shaped or campanulate, 4- to 8-lobed; lobes mostly contorted in bud. Stamens 4 to 8, inserted upon the corolla-tube; filaments free. Capsule 1- or partially 2-celled, containing many seeds attached to 2 opposite parietal placentas. Seeds small, albuminous. This order numbers about 60 genera and 450 species, chiefly from temperate and mountainous regions. Several of our native species are very beautiful, and a few of them merit introduction into large gardens. The Bog-Bean, *Menyánthes trifoliàta*, is a handsome plant for marshy bogs. It has trifoliate leaves and radical scapes of white or pink fringed flowers about a foot high. *Limnánthemum nymphæòides* is a rare aquatic plant with small orbicular floating leaves and bright yellow umbellate flowers about 1 inch in diameter. The Yellow Wort, *Chlòra perfoliàta*, is a glaucous annual growing a foot or more

high, remarkable on account of the leaves being joined together or connate by their bases. The bright yellow flowers are borne in trichotomous cymes. There is a fine variety in cultivation with flowers about an inch in diameter called *grandiflòra*. Besides the above we may mention the Centaury, *Erythræa Centaùrium*, a pretty annual with small pink or white flowers; and *Gentiàna Pneumonánthe*, a perennial species from 1 to 2 feet high, bearing large deep blue flowers towards the end of Summer.

1. GENTIÀNA.

Perennial or annual herbs. Leaves opposite, often ribbed. Flowers regular, solitary or cymose, often very brilliantly coloured. Calyx 4- or 5-lobed or spathaceous. Corolla funnel- or salver-shaped, 4- or 5-lobed, or rarely more; throat of the tube naked or bearded, or furnished with scales. Stamens 4 or 5. Fruit a 2-valved 1-celled many-seeded capsule. This is an extremely beautiful genus of plants, comprising about 150 species, found in nearly all temperate and alpine regions. *Gentiàna* is the classical name for some of the species.

1. *G. acaùlis* (fig. 169). Gentianella. — This is one of the most beautiful and at the same time one of the easiest-



Fig. 169. Gentiana acaulis. (½ nat. size.)

grown species of the genus. It is a perennial, attaining a height of 2 to 4 inches, bearing solitary terminal intense blue flowers of large size. The throat of the corolla is naked, and the calyx-lobes closely applied to the corolla-tube. A native of the Alps, flowering in Spring or Summer. *G. excìsa*, including *G. alpìna*, is very closely allied to the foregoing, but differs in its spreading calyx-lobes.

2. *G. vérna*.—A dwarf tufted species resembling the last in

habit and other particulars. But in this the azure-blue flowers are smaller, the calyx-tube is 5-winged, and the lobes small and erect. Corolla-tube narrower, with the limb about an inch in diameter, furnished with bifid scales at the throat between the lobes. This is a native of the North of England and some parts of Ireland, as well as the Continent.

G. Pyrenàica is an alpine species near the last, with a 10-lobed corolla, the lobes alternately larger and smaller; and *G. Bavàrica* is another closely-allied blue-flowered species, in which the radical leaves are not rosulate, and the throat of the corolla is naked.

3. *G. cruciàta.*—An erect-growing perennial about a foot high, bearing clusters of comparatively small blue flowers in the axils of the upper leaves. The corolla is 4-lobed and naked at the throat. Leaves decussate, lanceolate, 3-nerved, sheathing at the base. A native of mountainous parts of Central and Southern Europe.

4. *G. asclepiàdea.*—Near the last in size and inflorescence, though there are rarely more than 2 flowers from the axil of each leaf, and usually only one. Leaves relatively large, sessile, ovate-lanceolate, acuminate, 5-nerved, rough on the margin. Flowers deep blue, appearing in Summer. Corolla 5-lobed, naked at the throat; tube broadly club-shaped. A handsome plant and one of the best for borders and general cultivation. There is a variety with white flowers. It is a native of the Alps and Apennines.

5. *G. lùtea.*—This is a tall-growing plant from 3 to 4 feet high with large ovate or elliptical nerved leaves and dense clusters of yellow flowers in the axils of the upper leaves. Corolla 5-lobed, throat naked, lobes often having 3 rows of dark lines or dots. A native of the mountainous parts of Central Europe, flowering with us in June or July. This species furnishes much of the officinal Gentian-root.

6. *G. Saponària*, syn. *G. Catésbæi* of some authors.—An erect free-growing species with ovate-lanceolate or obovate leaves narrowed at the base and rough on the margins. Flowers light blue, clustered in the axils of the upper leaves; corolla-tube broad, limb 5-lobed; lobes small, erect, alternating with bifid fringed appendages. A native of North America, flowering towards the end of Summer.

7. *G. Andréwsii*, *G. Saponària* of some writers, and perhaps oftener seen under that name in gardens. It differs from

the preceding species in its broader foliage and inflated corollas which are nearly closed at the mouth and destitute of a limb, the primary lobes being absent and replaced by the fringed and toothed appendages. A native of North America.

G. septémfida has spotted white and blue flowers; *G. gélida* has campanulate purplish blue flowers; *G. punctàta* has them pale yellow with dark spots; and *G. Pneumonánthe* var. *álba* has large white flowers.

Sabbátia campéstris is an elegant tender annual from Texas, growing about a foot high and bearing clusters of small rose-coloured flowers with a yellow centre; *S. stellàris* and *S. chloroìdes* are hardy slender North American annuals with rosy purple or white flowers. The corolla in this genus is rotate, with from 5 to 12 divisions and an equal number of stamens.

Swértia perénnis is a European perennial with quadrangular smooth stems about a foot high, elliptical leaves, and dull violet flowers. Corolla rotate, 5-lobed; lobes fringed.

Order LXXII.—POLEMONIÀCEÆ.

Annual or perennial herbs of erect or rarely climbing habit, rarely shrubs. Leaves opposite or alternate, simple or compound. Inflorescence various. Flowers regular, pentamerous. Calyx inferior, 5-lobed. Corolla slightly perigynous, campanulate, funnel-shaped or salver-shaped. Stamens 5, inserted upon the corolla-tube and alternating with its lobes. Fruit a 3-celled 3-valved few or many-seeded capsule, splitting loculicidally. Seeds angular, winged or oval, with spongy testa and fleshy or horny albumen. A small order confined to temperate and cold regions, especially numerous in North-western America. There are 17 genera and upwards of 100 species.

1. PHLOX.

Handsome herbs with simple entire opposite and alternate leaves and cymose usually bracteate flowers. Calyx deeply 5-lobed, often prismatic or angled. Corolla salver-shaped with a long slender tube and wedge-shaped lobes twisted in bud. Cells of the capsule 1-seeded. An exclusively North American genus, contributing some of the showiest denizens of our gar-

dens. The name is from φλόξ, flame, in allusion to the bright-coloured flowers.

1. *Ph. paniculàta.*—A tall perennial with numerous slender erect glabrous simple stems, ovate or oblong-lanceolate acuminate leaves, and large terminal panicles of flowers. Calyx-lobes slender, finely pointed. *Ph. acuminàta* (fig. 170) is a variety with the stems and under-side of the leaves hairy, the latter are also broader and more pointed. This handsome species varies in the colours of its flowers from lilac, pink, or purple, to white, and, crossed with the next, has given birth to the numerous fine varieties now in cultivation. Many of these are strikingly beautiful from the effective contrasts of colour they exhibit. Some of the white-flowered varieties especially, with a crimson, violet, or purple eye, are unsurpassed for brilliancy amongst herbaceous plants. The self or unicoloured varieties range from the purest white, through cream, salmon, lilac, pink, and purple, to crimson, and to these may be added many splendid bicoloured or variegated varieties.



Fig. 170. Phlox acuminata. (⅛ nat. size.)

2. *Ph. maculàta.*—This is very near the last, differing in its narrower oblong panicle and scarcely-pointed calyx-lobes. The stems are dwarfer and spotted with purple, and the flowers sweet-scented. The normal tint of the flowers is purple, but they vary in colour, and a white variety has been described as a distinct species under the name of *Ph. suavèolens.* Then there is the form with a more pyramidal inflorescence called *Ph. pyramidàlis.* The garden varieties of this and the preceding are so blended and intermixed that it is now impossible to refer them to their respective species. Moreover, the typical plants are almost unknown out of botanical collections. *Ph. decussàta* is a name applied to some of the hybrid varieties. *Ph. divaricàta*, syn. *Ph. Canadénsis*, is a plant of more straggling habit, with clammy oblong-ovate leaves and a loose inflorescence of pale lilac or bluish flowers with notched petals ;

and *Ph. Carolìna* and *Ph. ovàta* have semi-erect smooth stems and foliage, and small terminal crowded cymes of pink or purplish flowers with entire rounded petals.

3. *Ph. subulàta* (fig. 171).—This beautiful dwarf species grows in dense tufts, producing its pink, purple, or white flowers, with a darker centre, in great profusion in early Spring. Leaves very narrow and usually clothed with hairs. But the variety called *setàcea* has them nearly or quite smooth. There are white varieties in cultivation, under the names *Nelsònii* and *nivàlis*. *Ph. frondòsa* of gardens is a variety of this species. North America.



Fig. 171. Phlox subulata. (½ nat. size.)



Fig. 172. Phlox Drummondii. (½ nat. size.)

x 2

4. *Ph. réptans*, including *Ph. vérna* and *Ph. stolonífera*.—A creeping not tufted species, with obovate or rotundate rather thick nearly smooth leaves. Flowering stems from 6 to 12 inches high, clammy-pubescent. Flowers reddish purple, in small cymes; lobes of the corolla entire. North America.

5. *Ph. Drummóndii* (fig. 172).—This is the only annual species in cultivation, and a charming dwarf plant, now, perhaps, more universally grown than any other of its class. It is equally rich in varieties with the perennial species, and one of the most profuse-blooming plants we can call to mind. There is about the same range of colour in the varieties, and it includes some very handsome streaked and marbled ones. It is a native of Texas, and not quite so hardy as the other species.

2. COLLÒMIA.

Dwarf annuals with narrow alternate leaves and dense terminal heads of small red or buff flowers. Calyx deeply 5-lobed, campanulate. Corolla salver-shaped, with a long slender tube. Cells of the capsule 1- or 2-seeded. A small genus whose species are confined to the western side of North and South America. The name is from the Greek *κόλλα*, glue, in reference to the glutinous coating of the seeds. When the seeds are put into water this mucous coating expands and forms a cloud around them.

1. *C. coccínea*, syn. *C. Cavanillèsii*. — This plant grows about a foot high, and is the best for ornamental purposes. The leaves are sessile and lanceolate, or oblong, and as well as the stems clothed with a somewhat clammy pubescence. The flowers vary from brick-red to buff. A native of Chili.

C. grandiflòra, a Californian species, has rather larger flowers, about 10 lines long, of a buff or pink colour.

3. GÍLIA.

This genus in its widest sense includes many species differing greatly in habit, but almost identical in structure. These are known in gardens under the generic names of *Ipomópsis*, *Leptósiphon*, *Fénzlia*, etc. The principal characteristic of these plants is to have several angular seeds in each cell of the capsule, and the stamens inserted at the mouth of the corolla-tube. The corolla varies from salver-shaped to campanulate. The species are all annual or biennial, and natives of America. The genus was named in memory of a

Spanish botanist. The following are the species usually known in gardens under this name, and in these the corolla-tube is very short, scarcely exceeding the calyx-lobes.

1. *G. capitàta.*—An erect annual from 2 to 3 feet high with deeply lobed and dissected sessile leaves and terminal dense heads of small blue flowers on long naked peduncles. A native of California.

2. *G. trìcolor.*—A slender glabrous annual about a foot high. Leaves bipinnately divided into narrow linear segments. Flowers about 8 or 10 lines in diameter, 2 to 4 together at the ends of the branches, purple and lilac with a deeper shade in the centre. This is a very pretty plant, of which there are several varieties in gardens. Also from California.

3. *G. dianthoìdes*, syn. *Fénzlia dianthoìdes.*—A dwarf tufted branching annual about 6 inches high, with simple linear often opposite leaves and solitary terminal rosy lilac flowers having 5 dark purple spots around the centre. A native of California.

The next sub-genus is *Leptósiphon*, so named from the long slender tube of the corolla. The species are all dwarf annuals, rarely exceeding a foot in height, and often not more than 3 or 4 inches. They are charming little subjects, with extremely slender stems and deeply palmately divided leaves with narrow linear segments, and terminal corymbose heads of brightly coloured flowers. *L. Androsàceus* (fig. 173) has rosy purple, lilac or white flowers; *L. densiflòrus* is a similar plant with rather larger pale purple or white flowers; *L. lúteus*, small yellow or orange-coloured flowers, according to the variety; and *L. ròseus* has delicate rose-coloured flowers. There are also many very elegant and beautiful hybrid varieties between the foregoing species.



Fig. 173. Leptosiphon Androsaceus. (½ nat. size.)

Leptodáctylon Califórnicum is a charming little undershrub from California, and is well adapted for planting out in early

Spring, though not quite hardy enough to withstand the severity of our Winters. It grows about 18 inches or 2 feet high, with the sessile leaves palmately divided to the base into linear rigid segments, and comparatively large solitary rose-coloured flowers, produced in the greatest profusion from the tips of the short lateral branches.

Ipomópsis élegans, syn. *Gília coronopifòlia*, is a tall slender biennial from 2 to 4 feet high, with divided leaves and terminal panicles of orange-scarlet flowers spotted with purple. There is also a rose-coloured variety.



Fig. 174. Polemonium cæruleum. (¼ nat. size.)

4. POLEMÒNIUM.

Perennial herbs with alternate unequally pinnate leaves and corymbose blue or white flowers. Calyx campanulate. Corolla rotate, 5-lobed. Stamens declinate, inserted on the throat of the corolla; filaments hairy at the base. Cells of the capsule many-seeded. There are about twelve species in temperate northern regions. The name is from πόλεμος, war, but the application is not satisfactorily explained.

1. *P. cærùleum* (fig. 174). Jacob's Ladder, Greek Valerian.—An elegant border plant, and one of the oldest favourites in cottage gardens. Stems about 2 feet high, angular and fistular, and as well as the foliage glabrous or slightly pubescent, and glandular. Flowers white or blue, according to the variety, appearing in Summer. There is also a handsome variety with variegated foliage and white flowers.

A native of Central and Northern England and Europe, North Asia, and North America.

2. *P. pulchérrimum.*—A dwarfer less foliaceous species scarcely attaining a foot in height. Leaflets smaller, obtuse. Flowers bright blue, smaller, but more numerous than in the preceding. A native of North America, blooming in Summer.

P. réptans, *hùmile*, etc., are other North American species of dwarf spreading habit and blue or white flowers. The former is desirable on account of its early flowering season.

5. COBÆA.

Tall climbing rapid-growing perennials. Leaves pinnate, composed of 2 or 3 pairs of leaflets, and a terminal tendril.



Fig. 175. Cobæa scandens. (¼ nat. size.)

Flowers large, campanulate, solitary and axillary. Calyx foliaceous, persistent. Stamens and style declinate. Cells of

the capsule several-seeded; seeds large, winged. There are three species described, from Mexico and Guayaquil. This genus was named after Cobo, a Spanish botanist.

1. *C. scándens* (fig. 175).—This is the species commonly seen in gardens, having large purplish flowers. For out-door culture it is usually treated as an annual, and deserves to be more extensively employed for covering balconies and training around windows, on account of its rapid growth and pleasing foliage. It is a native of Mexico. There is a beautiful variety with variegated foliage.

C. stipulàris from Mexico and *C. macrostèma* from Guayaquil have yellowish green flowers, the former being remarkable for its large stipules, and the latter for its long stamens, which exceed the corolla by one half.

Cantùa is a genus of handsome flowering shrubs from the mountains of Peru and Columbia. Leaves small, entire or pinnatifid, and alternate. Corolla funnel-shaped. Stamens more or less exserted. *C. buxifòlia* and *C. bìcolor* have splendid large orange and red pendulous flowers from the upper part of the branches; and *C. pyrifòlia* has erect white and yellow flowers in terminal corymbs. These shrubs belong more properly to the greenhouse, though they will succeed in the open air near the sea in the south-western counties of England.

Order LXXIII.—HYDROPHYLLÀCEÆ.

(Including *Hydroleàceæ.*)

Shrubs or herbs, often clothed with hispid hairs. Leaves lobed, alternate, or the lower ones opposite. Flowers in gyrate or unilateral racemes or spikes, rarely solitary and axillary. Calyx inferior, deeply 5-lobed, sometimes with appendages in the sinuses. Corolla regular, 5-lobed, campanulate, rotate or funnel-shaped. Stamens 5, inserted on the tube of the corolla and alternating with its lobes. Fruit a 1- or incompletely 2-celled 2-valved capsule; seeds few or many, attached to parietal placentas which sometimes meet in the centre. A small order with about sixteen genera and seventy-five species, chiefly American. The species of *Hydrophýllum* itself are almost unknown in gardens. They are North American herbaceous plants with large pinnately or palmately lobed leaves and

scorpioid cymes of rather small blue or white flowers with bearded stamens. The most familiar genus of this group is

1. NEMÓPHILA.

Dwarf branching showy annuals. Leaves pinnatifid. Flowers conspicuous, solitary, axillary or extra-axillary, on slender peduncles. Calyx 5-lobed and furnished with reflexed teeth between the lobes, these teeth or appendages enlarging after the flower expands. Corolla rotate or broadly campanulate. Stamens included. Capsule 1- to 4-seeded. This genus is exclusively North American, and the species are mostly from California. The name is a compound of *νέμος*, a grove, and *φιλέω*, to love, from the natural habitat of some of these plants.

1. *N. insignis* (fig. 176), syn. *N. Menziesii*.—A handsome diffuse annual bearing a profusion of sky-blue flowers having a



Fig. 176. Nemophila insignis. (½ nat. size.)

white eye in the original variety. There is a pure white variety, a blue variety bordered with white, and another with blue streaks on a white ground.

2. *N. maculàta.*—Leaves very hairy, pinnatifid, with rounded acute or obtuse lobes. This has large white flowers with a violet-purple blotch on each lobe of the corolla.

3. *N. atomària.*—Leaves pinnatifid. Flowers white speckled with blue or chocolate, hairy within at the base. There are several garden varieties, differing in the colouring of the flowers; as, white with a black centre, pale blue with black centre, and blue with white and blue speckled centre. *N. discoidàlis* is a variety of garden origin of the foregoing, having rather smaller purple brown flowers edged with white.

N. aurìta has the pinnate hairy leaves produced at the base in two lateral ear-like lobes which embrace the stem. Flowers purple-violet. *N. phacelioìdes* is a more foliaceous plant in which the more or less bipinnatifid leaves are broadest in the middle and narrowed into a short petiole at the base. Flowers blue with a light eye.

Phacèlia congésta is an allied erect slightly branching annual about 1 foot high with pinnate or pinnatifid leaves with sharply toothed lobes and circinate cymes of small purplish blue flowers. The calyx is destitute of appendages, and the stamens exceed the corolla.

2. COSMÁNTHUS.

North American annuals of procumbent or erect habit. Leaves pinnatifid; radical stalked, cauline sessile. Flowers in terminal circinate racemes or spikes. This genus is mainly distinguished by its fringed corolla, whence the name, from *κόσμος*, beautiful, and *ἄνθος*, a flower.

1. *C. fimbriàtus.*—A somewhat succulent trailing plant with angular spreading branches and pinnatifid leaves, the upper ones stem-clasping. Flowers violet tinged with white, or wholly white.

2. *C. grandiflòrus*, syn. *Eùtoca speciòsa.*—A tall branching tufted species from 3 to 5 feet high. Leaves broadly rhomboid. Flowers large, violet. *C. viscidus*, syn. *E. víscida*, is a native of California, growing about a foot high, with weak branching clammy stems and oval or oblong petiolate crenately lobed leaves. Flowers deep blue with a spotted pink eye, borne in small circinate racemes.

The species of *Eùtoca* proper have entire petals and numerous smaller seeds, or at least more numerous ovules. *E. Menzièsii*, syn. *E. multiflòra* and *E. Wrangeliàna*, are less showy annuals

having purple, blue or pink flowers. *E. Ortgiesiàna* is a recently introduced perennial species of trailing habit with purple and white flowers.

3. WHITLÀVIA.

Dwarf branching glandular pubescent annuals with simple petiolate leaves and large campanulate racemose flowers. Calyx deeply 5-partite. Corolla tubular-campanulate, inflated at the base. Stamens exceeding the corolla; filaments with an appendage at the base. Capsule many-seeded. Named in honour of Francis Whitla, a patron of botany.

1. *W. grandiflòra.*—This is a very showy plant with large deep blue Campanula-like flowers and deltoid or oblong coarsely-toothed hispid leaves. A native of California.

4. WIGÁNDIA.

Tall hispid herbaceous plants, remarkable for their large bold foliage. Leaves alternate, simple, more or less toothed or lobed, becoming gradually smaller upwards. Flowers in gyrate cymes, resembling those of *Eùtoca* in structure. The few species known are natives of tropical America, and, therefore, only available for Summer decoration. This genus was named in honour of Wigand, formerly Bishop of Pomerania.

1. *W. Caracasàna.*—A magnificent plant attaining a height of 6 to 12 feet or more, densely clothed with broad oval leaves, the lower ones from 2 to 3 feet long.

W. ùrens and *W. Vigièri* have likewise very large ornamental foliage, but the former is clothed with virulent stinging hairs.

Order LXXIV.—CONVOLVULÀCEÆ.

Twining or trailing herbs, rarely shrubs or trees. Leaves alternate, entire or lobate. Flowers in axillary or terminal racemes or solitary. Calyx of 5 equal or unequal persistent imbricate sepals. Corolla hypogynous, regular, salver-shaped or tubular, 5-lobed or nearly entire, plaited, convolute or twisted in bud. Stamens 5, inserted on the corolla-tube; filaments often dilated at the base. Capsule 1- to 4-celled, few-seeded. A large order of highly ornamental plants, chiefly natives of tropical countries. There are 40 genera and about 650 species. The curious leafless genus *Cúscuta* is referred here. The species are annual

parasites with slender thread-like stems and clusters of small flowers. Two species are indigenous, one of which (*C. Epithýmum*) is common on Heather and other dwarf plants, and the other (*C. Europæa*) is a stouter plant, much rarer, and usually found on Nettles or Vetches. One or two exotic species have been introduced with Flax and Clover seeds, and have often much damaged the crops they prey upon.

1. CONVÓLVULUS (including *Calystègia*).

Annual or perennial herbs with cordate, sagittate or lobate leaves and solitary or racemose axillary showy flowers with or without conspicuous bracts. Corolla funnel- or salver-shaped, plaited. Capsule 2-celled; cells usually 2-seeded. A large genus comprising nearly 100 species, found in temperate and tropical regions. The name is from the Latin *convolvo*, to entwine.

Our native species of *Convólvulus* are all perennial and very handsome, though they are too common to gain many admirers. *C. arvénsis* is the creeping species with white or pink flowers, often a great pest in cultivated ground; *C. sèpium* is the large white-flowered plant of hedgerows; and *C. Soldanélla* is a trailing maritime plant with pink or pale purple flowers.

1. *C. trìcolor* (fig. 177). — This charming little South European annual is the *Convólvulus mìnor* of seedsmen.



Fig. 177. Convolvulus tricolor. (¼ nat. size.)

Description is hardly necessary. Suffice it to say that it is a decumbent plant with silky foliage and large solitary tricoloured

flowers. The centre of the flower is yellow, followed by a white band, and is bordered with deep blue in the common variety; but there are several garden varieties variously striped with some or all of the above colours, and others in which violet enters. There is also a double-flowered variety.

C. althæoìdes is a twining perennial species from the South of Europe, with silvery lobed or dissected leaves and delicate rose-coloured flowers borne in pairs. *C. pubéscens*, syn. *Calystègia pubéscens*, is another twining species with hastate downy leaves and large flesh-coloured flowers. The variety in cultivation has very double flowers and is very showy, but hardly suitable for planting in a border on account of its running roots. It is reported to come from China. *C. Dahùrica* has cordate leaves and handsome deep rose-coloured flowers. The species formerly referred to *Calystègia* have two large leafy bracts overlapping the calyx.

2. PHARBÌTIS.

The species included under this name differ but slightly

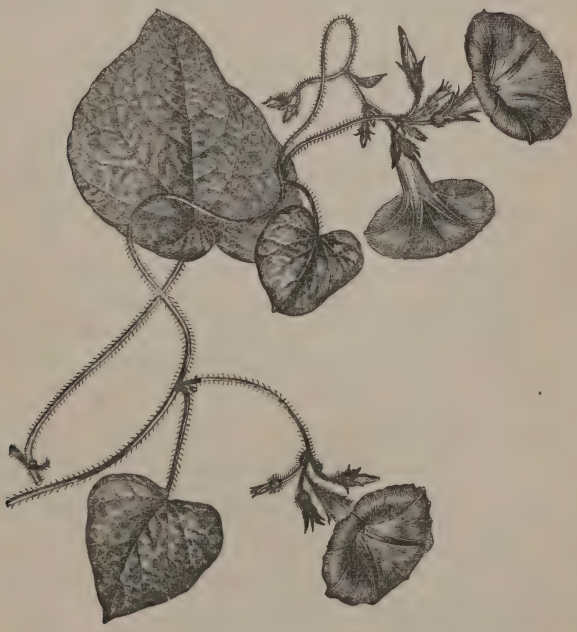


Fig. 178. Pharbitis hispida. (¼ nat. size.)

from the true *Convólvuli*. They are distinguished by having the stigma capitate or lobed, not divided into slender arms, and

by the capsule being 3-celled. The derivation of the generic name is obscure, but it is said to come from *φάρβη*, colour, in allusion to the variety and brilliancy of the colours of the flowers.

1. *Ph. híspida*, syn. *Ipomœ̀a purpùrea*, *Convólvulus mutábilis* and *C. màjor* (fig. 178). Morning Glory.—The colour of the flowers in the typical variety is a deep violet, but like its dwarf representative it has given birth to many handsome varieties, such as white, rose, carmine, or blue, or a combination of two or more of these colours. It is an annual of South American origin.

2. *Ph. hederàcea*, syn. *P. Nil* var. *limbàta* and *Ipomœ̀a hederàcea.*—This is a pretty dwarf annual from North America, of which there are several handsome varieties in cultivation, varying from azure-blue, blue, or violet and white to carmine and white. Leaves distant, petiolate, trilobate, acute, cordate at the base, and clothed with silky hairs on both sides.

Order LXXV.—NOLANACEÆ.

This is a small order intermediate in characters between the last and the next following. The species are herbaceous or woody erect or prostrate plants with alternate simple exstipulate leaves and showy flowers. Calyx deeply 5-lobed, valvate in æstivation. Corolla funnel-shaped or salver-shaped, with a plaited æstivation. Stamens 5, equal, alternating with the lobes of the corolla. Fruit of 5 or more distinct or partially confluent nuts enclosed in the persistent calyx; nuts by abortion usually only one-seeded. Seeds albuminous. There are six genera and about thirty-five species belonging to this order. All natives of South America.

1. NOLÀNA.

Trailing annuals with showy flowers resembling those of *Convólvulus.* Corolla campanulate. Fruit 4-celled, 4-seeded. The species are all South American. Generic name from *nola*, a little bell, the form of the flowers.

1. *N. prostràta.*—A prostrate annual with somewhat fleshy oval petiolate leaves and solitary axillary flowers about an inch in diameter. Corolla violet-blue, with a yellow tube.

N. atriplicifòlia, *paradóxa*, and *lanceolàta* are closely allied species or perhaps varieties; the first, having white, blue, and yellow, or wholly white flowers, is the best.

Order LXXVI.—BORRAGINÀCEÆ.

Herbaceous or suffruticose plants having terete stems and alternate simple exstipulate usually scabrid leaves. Flowers regular or irregular, in gyrate spikes, racemes or cymes, rarely solitary and axillary. Calyx persistent, 4- or 5-lobed, valvate in bud. Corolla of various forms, usually 5-lobed, with an imbricate æstivation, the throat often furnished with hairs or scales opposite the lobes. Stamens equalling the corolla-lobes in number and alternate with them. Fruit of 4 indehiscent 1-seeded distinct nuts, or rarely of two 2-celled nuts; seeds separable from the pericarp, usually destitute of albumen. This is an extensive order, comprising 50 genera and 600 species, distributed all over the globe, and especially abundant in the Mediterranean region.

1. CERÍNTHE.

A small European genus remarkable for the smooth glaucous stem-clasping foliage of its species. They are with one or two exceptions of annual duration. The flowers are in one-sided leafy racemes, yellow or yellow and purplish violet. Corolla tubular; throat naked. Anthers sagittate, cohering at the base. But the principal distinctive character is in the fruit, which is composed of 2 free 2-celled nuts. The name is from *κηρός*, wax, and *ἄνθος*, a flower, in allusion to the fondness of bees for these flowers, and hence the English name Honeywort.

1. *C. màjor.*—A branching annual about a foot high. Leaves glaucous, oval, stem-clasping, minutely toothed and clothed with rough white tubercles. Corolla pale yellow, violet and yellow, or dull violet, constricted at the mouth and shortly 5-toothed, the teeth reflexed.

C. mìnor is of smaller growth, with similar auricled leaves and smaller yellow flowers, sometimes with 5 brownish spots. Corolla divided about a third of the length into 5 subulate erect teeth. *C. retórta* has yellow and brown flowers with a curved corolla, and the leaves covered with silvery blotches.

2. ÈCHIUM.

Tall herbaceous or suffruticose plants, usually clothed with rough hairs having a thickened base. Leaves entire. Flowers blue, violet, red or white, in spiked or racemose panicles. Calyx 5-lobed. Corolla cylindrical or funnel-shaped, with a dilated naked throat and an unequally 5-lobed limb. Stamens exserted; anthers free. Nuts 4, rough, inserted on the flat receptacle by a flat base. There are about fifty species, chiefly from the Mediterranean countries and South Africa. The generic name is from ἔχις, a viper, from the resemblance, it is said, of the seeds or nuts of some species to a viper's head. The Viper's Bugloss, *E. vulgàre*, is a handsome indigenous species with reddish purple, ultimately blue, or rarely white flowers. It grows from 1 to 3 feet high, and is of annual or biennial duration.

E. violàceum is an allied species with long simple spikes of remarkably bright violet-blue flowers. *E. Crèticum* is a dwarfer annual plant with red flowers; and *E. pompònium* a tall biennial with flesh-coloured flowers.

Borràgo officinàlis, Borage, occasionally seen in gardens and waste places, is a distinct plant with broad sinuate leaves and large blue flowers with conspicuous black anthers. The flowers are borne in a loose cyme, and remarkable for the rotate deeply-lobed corolla having broad notched scales at the mouth of the tube.

3. SÝMPHYTUM.

Perennial scabrid herbs with thick fleshy roots. Radical leaves stalked, cauline sessile or decurrent. Flowers white, red, purple, blue or yellow, in terminal bracteate cymes. Calyx 5-lobed or -toothed. Corolla tubular, inflated, shortly 5-toothed, the throat closed by ciliated scales. Stamens 5, included. Nuts 4, smooth. There are about fifteen species in Europe and West Asia. The name is said to be an altered form of a Greek word signifying to cement, in allusion to the healing properties of some species. *S. officinàle*, Comfrey, a British species, is a tall herb with ample foliage and yellow or purplish flowers. This species was formerly employed in domestic medicine.

1. *S. Bohèmicum.*—This is scarcely distinguishable from the common Comfrey, except in its bright reddish purple flowers, which appear in Summer.

2. *S. aspérrimum.*—A tall-growing species, remarkable for

the prickly bristles with which it is closely beset. The flowers are red in bud and eventually blue. A Caucasian plant, blooming in Summer.

S. Caucásicum, from the same region, is a dwarf-growing species with bright blue flowers.

4. ANCHŪSA.

This genus is very nearly allied to the last, but the corolla is funnel-shaped and the nuts rugose or granulate. The species number about thirty, and are found in Europe and West Asia. The derivation of the generic name has not been satisfactorily explained. Two species are found in waste places in Britain, but neither is considered to be indigenous. *A. officinàlis*, Alkanet, is a biennial having softly hispid narrow lanceolate leaves and terminal cymes of violet-blue flowers with white papillose scales, the corolla-tube equalling or exceeding the limb; and *A. sempervìrens* is a perennial with rough ovate leaves and bright blue flowers about 8 lines in diameter, in which the corolla-tube is shorter than the limb.



Fig. 179. Anchusa Italica. (¼ nat. size.)

1. *A. Itálica* (fig. 179). —A handsome perennial species from 3 to 4 feet high with shining foliage and bright blue flowers. The radical leaves are lanceolate and from 1 to 2 feet in length. A native of the South of Europe, flowering all the Summer.

There are numerous other species, but the above is the only ornamental plant of any value.

5. PULMONÀRIA.

Perennial tufted herbs with simple flowering stems and terminal cymes. Calyx angular, deeply 5-partite. Corolla funnel-shaped, 5-lobed, with 5 tufts of hairs alternating with the stamens, the latter included. Nuts 4, turbinate, smooth, sessile on a flat receptacle. There are five species, natives of Europe and North Asia. The name is from *pulmo*, the lungs, in allusion to the supposed efficacy of these herbs in lung complaints ; hence the English name Lungwort.

1. *P. officinàlis.*—Leaves radical, ovate-lanceolate, on long petioles, often spotted with light green. Flowers red, changing to blue or purple. This is a common plant in old gardens, and generally known by the blotched leaves, though there is a variety without blotches and another with white flowers. A native of various parts of Europe, and occasionally found in a semi-wild state in Britain.

P. angustifòlia, similar to the last, with narrow leaves and pink ultimately bright blue flowers, is believed to be truly indigenous in Hants and Dorset. *P. Sibírica* is of more slender habit, with uniformly green leaves and deep blue flowers. They all flower in Spring.

Mertènsia Virgínica, Virginian Cowslip, is an allied perennial plant from 1 to 2 feet high with smooth pale green foliage and pale blue, purple or white flowers in terminal clusters. It is separated from *Pulmonària* on account of the stamens exceeding the corolla-tube, and the nuts being fleshy when fresh. *M. marítima* is a native species, found on the western coast.

Onósma Taùricum is a handsome tufted herbaceous plant less than a foot high, with lanceolate hispid leaves and large golden yellow flowers in drooping clusters. The stamens exceed the naked corolla, and the nuts are stony. There are several other species, but this is one of the best.

6. LITHOSPÉRMUM.

Hispid or hairy annual or perennial herbs, sometimes shrubby at the base, often of prostrate habit. Flowers in bracteate cymes. Calyx 5-lobed to the base. Corolla funnel- or salver-shaped ; throat naked, or with 5 tumid folds ; limb spreading.

Stamens included. Nuts 4, very hard and bony, smooth or rugose. There are about fifty species, scattered over Europe, North Asia, and North America. The name is a compound of λίθος, a stone, and σπέρμα, a seed, in reference to the stony carpels or nuts. There are three indigenous species:—*L. officinàle*, Gromwell, is an erect perennial with small yellowish white flowers and smooth white nuts; and *L. arvénse* is an erect branching annual with yellowish white flowers and grey wrinkled nuts. The third species is—

1. *L. purpùreo-cærùleum.*—This is a handsome perennial with creeping barren and erect flowering stems about a foot high. Leaves scabrid, small, sessile, linear-lanceolate. Flowers about 8 lines in diameter, purple and blue, appearing in Summer. A rare plant in Britain, being confined to a few localities on limestone and chalk hills in the South.

2. *L. prostràtum*, syn. *L. fruticòsum.*—A shrubby evergreen trailer with narrow lanceolate hairy leaves and beautiful deep blue flowers striped with reddish violet. This is one of the most effective dwarf plants in cultivation. It is a native of the South of Europe, and produces its handsome blossoms from May till July.

L. Gastòni is another handsome species of this group.

7. MYOSÓTIS.

Annual or perennial herbs more or less hispidly hairy. Radical leaves petiolate; cauline sessile, oblong or lanceolate. Flowers in scorpioid cymes or racemes, with or without bracts. Calyx-tube equalling or exceeding the 5-lobed limb. Corolla funnel-shaped, with 5 notched scales in the throat. Stamens included. Nuts 4, very small, and usually smooth and glossy. The species of this genus are found in the temperate regions of both hemispheres. The name is from μῦς, mouse, and οὖς, ὠτός, ear, from the resemblance of the soft hairy leaves of some species. We have eight indigenous species, popularly known by the names of Forget-me-not and Scorpion Grass. The following enumeration includes the best of them.

1. *M. palústris.* Forget-me-not.—A perennial species growing in wet marshy places and on the borders of ditches Leaves bright glossy green, oblong or spathulate, upper slightly decurrent. Flowers sky-blue with a yellow centre. One of the loveliest members of the native flora, producing its pretty

blossoms from May to July. *M. lingulàta*, syn. *M. cæspitòsa*, hardly differs in its smaller flowers, appressed hairs, and the style much shorter than the calyx.

2. *M. sylvática.*—An erect biennial or perennial ? 1 to 2 feet high. Radical leaves petiolate, ligulate or spathulate, acute or apiculate, clothed with spreading hairs. Flowers blue, with a yellow throat and short tube, about 4 lines in diameter. Pedicels much longer than the calyx, the latter closed in fruit. Racemes very much elongated in fruit. A common British plant northward, but quite local in the South, where, however, there is an allied species called *M. arvénsis*, with flowers about half the size. There are several varieties of *M. sylvática* in cultivation with white, pink or striped flowers.

3. *M. dissitiflòra.*—This is a Continental species formerly grown under the name *M. montàna*, which it is not. It differs from the last in its shorter more appressed pubescence, brighter green foliage, and relatively longer pedicels which curve upwards and inwards when in fruit, and the nutlets strongly keeled on the face. It is considered to be one of the best for bedding purposes.

4. *M. alpéstris*, syn. *M. rupícola.*—A perennial of more decumbent habit than the two last, with stouter branches and less elongated racemes. Pedicels short and stout. Flowers bright blue with a yellow eye about 4 lines in diameter. This is a native of the higher mountains of North Britain, blooming in its native habitats in July and August.

5. *M. Azórica.*—Similar in habit to the last. The flowers of this, however, are nearly 6 lines in diameter, and purple, eventually blue, without a yellow eye ; and the fruiting racemes lengthen considerably. A native of the Azores. The variety called *Impératrice Elisabeth* belongs here.

M. collìna and *M. versícolor* are the only other British species ; both are dwarf annuals with small flowers, changing in the latter from yellow to blue.

Myosotídium nóbile is a magnificent plant newly introduced from Chatham Island. It is a perennial, growing about 3 feet high, with large fleshy glabrous shining 7-nerved plicate leaves and dense racemes of azure-blue flowers. The flowers are about 6 lines across, and purplish towards the circumference. The fruit is composed of 4 large winged nuts.

Eritrichium nànum is a rare and diminutive alpine plant, growing in tufts, and producing an abundance of blue flowers.

8. OMPHALÒDES.

Annual or perennial herbs, distinguished by the 4 nuts being furnished with a membranous inflexed wing or border which renders them cup-shaped. There are several species from Southern Europe and Western Asia. The name is from ὀμφαλός, the navel, and εἶδος, form or shape, the resemblance of the nuts.

1. *O. vérna.* Venus's Navelwort.—A handsome and early-flowering herbaceous perennial with creeping branches and ascending flowering shoots about 6 inches high. Lower leaves cordate, on long slender petioles, glabrescent, upper narrower. Flowers blue, about half an inch in diameter, in loose racemes, appearing in March and April. South of Europe.

2. *O. linifòlia.*—A glaucous annual about a foot high with narrow leaves and long racemes of white flowers tinged with blue. A native of Portugal.

Cynoglóssum is a neighbouring genus whose species have ample foliage, blue, purple or reddish flowers, followed by large shortly stalked prickly nuts. *C. officinàle* has dull red flowers, and *C. montànum* bluish flowers; neither is very common in Britain.

Lindelòfia spectábilis, syn. *Cynoglóssum longiflòrum*, is a neat-growing perennial about a foot high with oblong leaves and racemes of showy blue flowers. It is from North India, and flowers towards the end of Spring.

9. HELIOTRÒPIUM.

Herbs or undershrubs with alternate petiolate leaves and lateral or terminal circinate cymes of small blue or white flowers. Corolla funnel- or salver-shaped, with a plicate limb. It differs from all the preceding genera in having the nuts consolidated, but eventually separating, and 1-seeded. There is one European species, and several others from the warmer and tropical parts of both the Old and New Worlds. The name is from ἥλιος, the sun, and τροπή, a turning, in allusion probably to the form of their inflorescence.

1. *H. Peruviànum.* Turnsole or Cherry-pie.—This tender dwarf shrub is so well known that description would be superfluous. The agreeable scent of its lilac or dark blue flowers forms its principal recommendation. There are now many

varieties in cultivation, varying in every shade from white to a rich dark blue and violet, or white and blue. *H. grandiflòrum*, differing mainly in its larger foliage and flowers, is probably the parent or co-parent of some of these varieties. The only objection to the second species is its comparatively scentless though larger flowers. The variety commonly seen in gardens under the name of *Voltaireànum* should be *Volterriànum*, after the village of Volterra in Italy.

H. suavèolens is a beautiful hardy annual species from the Caucasus, with white highly fragrant flowers. It appears to be almost unknown in this country, but in Russian gardens it takes the place of the Peruvian species.

Tournefórtia heliotropoìdes is an allied hardy suffruticose perennial from South America with violet-blue flowers.

Order LXXVII.—SOLANÀCEÆ.

Herbs or shrubs with alternate or sub-opposite entire or pinnatisect leaves and regular pentamerous flowers. Calyx inferior, 5- or rarely 4-lobed. Corolla regular or slightly unequal, hypogynous, usually 5-lobed, plaited, imbricated or valvate in æstivation. Stamens free, of the same number as the corolla-lobes, and alternate with them. Fruit usually 2-celled, capsular or baccate, rarely 4- or many-celled. Seeds many, albuminous, usually kidney-shaped. This is a large and important order, comprising about 50 genera and upwards of 1,000 species, the greater part from tropical countries. Amongst the useful species we may quote the Potato (*Solànum tuberòsum*), and Tomato or Love-Apple (*Lycopérsicum esculéntum*). It is worthy of remark, too, that many of the members of this family are virulently poisonous.

1. FABIÀNA.

Shrubs with small scattered or imbricated leaves and solitary extra-axillary flowers. Calyx tubular, 5-lobed. Corolla tubular, funnel-shaped; limb shortly 5-lobed. Stamens 5, included. Fruit capsular, 2-celled, 2-valved, enveloped in the persistent calyx. The few species described are all South American. The name is commemorative.

1. *F. imbricàta.*—A Heath-like evergreen shrub of close erect growth. Leaves small, crowded. Flowers pure white,

produced in great profusion in May or June. This charming little shrub is a native of South Chili, and will, therefore, need protection in very severe weather, even in the South of England.

2. LÝCIUM.

Deciduous climbing or trailing often spiny shrubs. Leaves simple, entire. Flowers small. Calyx tubular, 5-lobed. Corolla funnel-shaped. Stamens 5. Fruit baccate, enclosed in the calyx-tube. The species are from the Mediterranean region, Cape of Good Hope, Eastern Asia, and tropical America. A classical name applied to a thorny shrub.

1. *L. Bárbarum.* Box Thorn or Tea Tree.—This is the shrub so commonly seen covering cottage porches with long slender flexible shoots, small linear-lanceolate or oblong entire leaves, and small lilac or violet flowers followed by scarlet or orange berries.

L. Europæum is a spiny shrub with linear spathulate leaves and pink or reddish flowers. *L. Chinénse* is very near *L. Bárbarum*, but the tube of the corolla is shorter and constricted in the middle.

Desfontáinia spinòsa is a shrub of disputed affinity, with alternate coriaceous spinose-dentate Holly-like leaves and scarlet and yellow trumpet-shaped pendent flowers. It is a native of Chili, and therefore rather tender. *D. Hoókeri* and *D. Chilénsis* are probably varieties of the same species.

3. SOLÀNUM.

This genus includes more than half of the species belonging to the order. They are rare in temperate climates, but abound in the tropics and especially in tropical America. They vary from small annuals to trees of considerable size. Leaves various. Flowers in terminal or extra-axillary cymes. Corolla rotate or campanulate. Stamens 5; anthers large, connivent, opening by terminal pores. Fruit a many-seeded berry. The derivation of the name has not been satisfactorily explained. There are two species found in this country, at least in the southern portion. *S. Dulcamàra*, Bitter Sweet, a perennial of trailing or climbing habit with long flexuous stems, ovate-cordate often lobed leaves, and large clusters of purple flowers with yellow conspicuous anthers succeeded by scarlet berries. There is a variety of this with variegated foliage. *S. nìgrum* is neither so common nor so showy a plant. It is an erect annual

bearing small white flowers followed by black, yellow or red berries.

Although there are no hardy ornamental species in cultivation, there are many species employed for Summer decoration in the flower-garden. These species are so numerous that imperfect descriptions are of little service; but as the scope of our work will not admit of space for complete differential descriptions, we must content ourselves with a superficial notice of a few of those in general cultivation.

S. gigánteum, a large prickly shrub from the Cape of Good Hope, attaining a height of 20 feet. Leaves large, ovate, covered with a whitish pubescence. Flowers numerous, small, violet. — *S. marginàtum*, a very handsome shrubby species about 6 feet high, from Abyssinia. Leaves prickly, cordate, clothed with a white indumentum. Flowers large, white with a purple centre.—*S. laciniàtum*, syn. *S. aviculàre*, a succulent glabrous species with large pinnatifid leaves and blue flowers, a native of New Zealand.—*S. robústum*, a Brazilian species with decurrent spiny very large leaves which are clothed with a white or rufous pubescence.—*S. verbascifòlium*, a tall unarmed species from India and Australia, with large ovate leaves densely clothed with a soft velvety tomentum.—*S. betàceum*, a splendid species from 6 to 12 feet high with large cordate shining leaves and white flowers. Besides these we may enumerate: *S. crinìtum*, *S. auriculàtum*, *S. aculeatíssimum*, *S. glaucophỳllum*, *S. callicárpum*, *S. galeàtum*, and *S. macránthum*. Cultivators have recently devoted some attention to these plants, and they have already raised many fine hybrid varieties.

4. PHYSÀLIS.

Herbs or shrubs, differing from the last genus in the calyx, which enlarges after the expansion of the flower, and ultimately becomes much inflated, and encloses the baccate fruit. The anthers, too, open by longitudinal chinks instead of terminal pores. With the exception of one European species these plants are from tropical or sub-tropical regions, occurring in both the Old and New Worlds. The name is from φῦσα, a bladder, the form of the mature calyx.

1. *Ph. Alkekéngi*. Winter Cherry.—A dwarf branching perennial with geminate ovate entire acute leaves and solitary axillary small white flowers on slender peduncles. Calyx

assuming a reddish tinge, and enclosing the scarlet berries, which persist a great part of the Winter. A native of Central and Southern Europe.

Ph. édulis, the Cape Gooseberry, is nothing but *Ph. Peruviàna*, and is not indigenous at the Cape of Good Hope. This species is occasionally grown, and will ripen its fruit against a wall of southern aspect.

5. HYOSCŸAMUS.

Annual or biennial herbs. Leaves lobed or pinnatifid, usually viscid. Flowers regular, axillary. Calyx urceolate, 5-lobed. Corolla campanulate or funnel-shaped. Stamens 5, declinate. Fruit a 2-celled many-seeded capsule, swollen at the base, and constricted in the middle, and splitting transversely near the top. There are twelve species, found in warm and temperate parts of the Old World. The etymology of the word is obscure.

1. *H. nìger.* Henbane.—This plant is either annual or biennial, and is merely included here on account of its medicinal and poisonous properties. It is a branching viscid fœtid herb with hairy lobed or toothed leaves and sub-sessile yellowish flowers veined with purple. These characters taken with those given above will be sufficient to distinguish it, as no other species grows wild or is generally cultivated in this country.

Mandragòra autumnàlis, syn. *M. officinàlis*, is a handsome allied herbaceous plant with large fleshy roots, sinuate tufted radical leaves, and solitary scapose deep blue flowers, appearing in Autumn.

6. ATROPA.

This genus includes only one species, distinguished by its campanulate regular corolla and baccate 2-celled many-seeded fruit subtended by the foliaceous persistent calyx. The name is from Ἄτροπος, one of the Fates, from its highly poisonous properties.

1. *A. Belladónna.* Deadly Nightshade, Dwale.—A stout branching perennial, 2 to 4 feet high. Leaves ovate, acuminate, in unequal pairs, 4 to 8 inches long. Flowers solitary, pedunculate, green and purple. Berry black and fleshy, about the size of a small cherry. Found on chalky soil and waste places in this country.

7. NICOTIÀNA.

Tall stout usually viscid large-leaved herbs. Flowers racemose or paniculate. Calyx campanulate, 5-lobed. Corolla funnel- or salver-shaped; limb plaited. Stamens included. Fruit a 2-celled many-seeded capsule, dehiscing at the top in 2 or 4 valves. The species are natives of tropical America and Eastern Asia, but several are now found in a semi-wild state all over the world. The genus was named after Nicot, a Portuguese, who it is believed introduced tobacco into France. These plants are seldom used for ornamental purposes, though some of them might be worthy of a place in large gardens on account of their ample foliage.

N. rústica, *N. Tabácum*, and *N. macrophỳlla*, syn. *N. latíssima*, are the species of Tobacco commonly grown in Europe and elsewhere for their leaves. The first has yellowish green flowers and is of dwarfish habit, the others have pink flowers and large simple decurrent leaves, auricled at the base in the latter.



Fig. 180. Datura ceratocaula.

N. wigandioìdes and *N. glaùca* are ornamental in foliage, but the flowers are small and insignificant.

8. DATŬRA.

Shrubs or coarse fetid herbs with ovate angular lobed leaves and large showy solitary flowers. Calyx 5-lobed, separating transversely, the lower part persistent with the fruit. Corolla funnel- or salver-shaped, with a plaited 5- to 10-toothed limb. Capsule 4-celled, 4-valved, smooth or prickly; seeds large and flat. The few species are widely dispersed in warm and tropical regions, and

one, *D. Stramònium* (Thorn-Apple), is occasionally found in waste places in this country as a waif of cultivation. This has large white flowers, but there is a variety with violet flowers called *Tátula*. The generic name is an alteration of the Arabic *Tatorah*.

1. *D. ceratocaùla* (fig. 180) is a spreading or decumbent annual with thick fistular stems and odoriferous white flowers tinged with violet. A native of South America.

D. Mètel is an erect slightly-pubescent species with fragrant white flowers and large spiny capsules. *D. fastuòsa* has purplish stems and very long tubular funnel-shaped flowers, yellowish within, and tinged with violet externally. *D. hùmilis* has double flowers, and is considered to be a dwarf variety of the last. *D. meteloìdes*, similar to *Mètel*, with large longer-tubed flowers of a bluish violet.

9. PETÙNIA.

A small genus of South American herbaceous often viscid perennials. Leaves simple. Flowers solitary and axillary. Calyx 5-lobed; lobes spoon-shaped. Corolla funnel- or salver-shaped; limb 5-lobed, spread. Stamens 5, included, unequal. Fruit capsular, 2-celled, many-seeded. *Petun* is the Brazilian for Tobacco.



Fig. 181. Petunia violacea. (¼ nat. size.)



Fig. 182. Petunia nyctaginiflora. (¼ nat. size.)

1. *P. violàcea* (fig. 181).—This is one of the parents of the numerous hybrid varieties now in cultivation. A weak

straggling herb with viscid pilose shortly petiolate leaves and violet, lilac, white or striped flowers with a short tube.

2. *P. nyctaginiflòra* (fig. 182).—A stouter more erect-growing plant, in the wild form with white or yellow flowers remarkable for the long narrow tube of the corolla. The cut does not show this character, and was probably taken from one of the hybrid forms.

These two species cross with the greatest facility, and thus new varieties are constantly being raised. There are double and single, from deep violet and crimson to pure white, with many curious parti-coloured and variegated varieties. There are also some handsome varieties reticulated with dark purple on a rosy or carmine ground. Both species are perennial, but they will succeed well if treated as annuals.

P. phœnícea and *P. intermèdia* are almost forgotten now; the former is a strong-growing species with purple flowers about an inch in diameter, and the latter a small compact plant with smaller yellow and purple flowers.

10. NIEREMBÉRGIA.

Herbs or small shrubs with simple alternate leaves and solitary pedunculate flowers opposite the leaves. Calyx 5-lobed, persistent, and enclosing the fruit. Corolla funnel-shaped; tube often long and slender; limb 5-lobed, patent. Stamens 5, somewhat unequal, and more or less exserted. Fruit capsular, 2-celled. A small genus confined to South America, named in honour of Nieremberg, a Spanish Jesuit and naturalist. None of the species are absolutely hardy.

1. *N. grácilis.*—This is the beautiful slender trailing species in general cultivation at the present time. It has linear somewhat glaucous slightly pubescent leaves and very numerous pedunculate extra-axillary or terminal lilac and white flowers. It succeeds best in a light soil fully exposed to the sun.

N. filicaùlis, syn. *N. frutéscens* of gardens, is a closely allied species of erect habit with less numerous though rather larger flowers and quite glabrous foliage. *N. rivulàris* is a very distinct nearly hardy species of creeping tufted habit with broadly oblong obtuse long-stalked leaves and large white or pink flowers remarkable for the length of the slender tube.

Order LXXVIII.—SCROPHULARÌNEÆ.

A large order of herbs, shrubs, or rarely trees. Leaves opposite, or whorled below, but often alternate in the upper part. Calyx usually persistent, inferior, 5-cleft. Corolla regular or irregular, 4- or 5-lobed, imbricate or valvate in bud. Stamens 4, didynamous, with or without a rudimentary fifth, or 2 (rarely 5) perfect ones. Fruit a 2-celled capsule opening by valves or pores, rarely baccate. Seeds small, albuminous, few or many. There are about 180 genera and 1,800 species included in this family. They occur in all parts of the world. The ornamental herbaceous species are very numerous.



Fig. 183. Salpiglossis sinuata. (¼ nat. size.)

1. SALPIGLÓSSIS.

Viscid herbs with pinnatifid leaves and large showy solitary lateral or terminal flowers. This genus is exclusively South American, and differs from all the following in having a plaited corolla, and thus connecting this with the preceding order. Stamens 4, didynamous, with a fifth barren one. Fruit capsular, 2-celled, 2-valved, many-seeded. The name is from *σάλπιγξ*, a trumpet, and *γλῶσσα*, a tongue, the form of the stigma.

1. *S. sinuàta*, syn. *S. stramínea*, *S. variábilis*, etc. (fig. 183).—This is an herbaceous viscid branching perennial, though usually treated as an annual, from 1 to 2 feet high, with nume-

rous handsome flowers of various colours. They are white, yellow, rose, crimson, lilac, violet or maroon, or some combination of some of these colours, and frequently strongly veined or reticulated in a different colour from the ground. This is a race of dwarf varieties about half the height of the ordinary forms. A native of Chili.

2. SCHIZÁNTHUS.

Elegant annuals with pinnate, pinnatifid, lobed or toothed often viscid leaves and bright-coloured irregular flowers in 1-sided racemes or cymes. Calyx deeply 5-lobed. Corolla bilabiate, with deeply unequally lobed lips. Fertile stamens 2. Capsule membranaceous. There are about six species, natives of South America. The name is derived from *σχίζω*, to cut, and *ἄνθος*, a flower, in allusion to the dissected petals.



Fig. 184. Schizanthus Grahami. (¼ nat. size.)

1. *S. Gràhami* (fig. 184).—Leaves interruptedly pinnate; leaflets linear or oblong, serrate. Lower lip of the corolla 4-lobed, lobes acuminate; upper lip lanceolate, constricted near the apex. Flowers pale lilac and yellow.

2. *S. retùsus.*—Leaves interruptedly pinnate, lobes linear, obtusely serrate. Lower lip of the corolla 3-lobed; lateral lobes shorter, middle one bifid. Upper lip ovate-oblong, retuse. Flowers rosy pink and orange-yellow.

3. *S. pínnatus*, syn. *S. pórrigens.*—Leaves bipinnatifid. Upper lip of corolla oblong, emarginate, and constricted near the base, yellow dotted with red. Lower lip flesh-coloured or pink.

S. cándidus has pure white flowers, upper lip rounded, notched; and *S. Hoókeri* has pink and yellow flowers, upper lip much attenuated towards both ends.

Browállia elàta and *B. demíssa* are tender annuals from tropical America, with viscid or hairy foliage and small blue purple or white flowers.

3. CALCEOLÀRIA.

Herbs or undershrubs with viscid or hairy rarely glabrous foliage and terminal panicles or cymes of white, yellow, orange, purple, brown, violet or spotted showy flowers. The corolla affords the most striking character of this genus. It is 2-lipped, the upper one being small, and the lower large and inflated, bearing some resemblance to a slipper in some species, hence the generic name from the Latin *calceolus*, a shoe. In *C. jovellàna*, however, the lips are nearly equal. Stamens 2. Capsule 2-celled, subtended by the somewhat enlarged calyx. The species are mostly natives of South America, two extending to New Zealand. All those mentioned below are from South America.

1. *C. integrifòlia.*—An erect shrubby species, glabrous, pubescent, or viscid. Leaves varying from linear-lanceolate to ovate, crenate, rugose, narrowed into a short petiole. Flowers numerous, corymbose, yellow.

2. *C. amplexicaùlis.*—This species has ovate-lanceolate sessile stem-clasping crenate very hairy leaves and corymbose panicles of yellow flowers. *C. crenàta* is a closely allied species with sessile leaves and very numerous though rather smaller flowers.

In addition to the foregoing there are several nearly or quite hardy species, which will flourish in the warm humid climate of the South-west of England and Ireland; but they appear to be very rare, and probably some of the best are no longer to be found in cultivation. *C. Fothergíllii* is one of the hardiest herbaceous kinds, being found as far south as the Falkland Islands. It is a dwarf glandular pubescent herb with villous petiolate spathulate leaves and long narrow yellow and purplish brown flowers. *C. plantagínea* is an herbaceous scapose Chilian species with broad radical leaves and few yellow flowers spotted with red, on naked scapes about 9 inches high. *C. Kellyàna* is a hybrid form, said to be quite hardy, and probably the issue of a cross between the last-named and another species. *C. corymbòsa* has numerous yellow flowers. *C. arachnoìdea* is an erect branching species about 2 feet high, having the spathulate leaves clothed with a dense whitish cobweb-like down and terminal clustered purplish red flowers. *C. álba* is a shrubby species with linear remotely toothed leaves and

showy white flowers. *C. violàcea*, syn. *C. jovellàna*, has small ovate coarsely-toothed leaves and violet-purple flowers.

Very few of the pure species are cultivated, but the hybrid forms are numerous. They have been raised from *C. amplexicaùlis*, *C. integrifòlia*, syn. *C. rugòsa*, *C. corymbòsa*, *C. purpúrea*, *C. arachnoìdea*, *C. thyrsiflòra*, etc.



Fig. 185. Verbascum Phœniceum. (¼ nat. size.)

4. VERBÀSCUM.

Tall biennials or perennials with simple alternate and racemose simple or compound inflorescence. Flowers showy, white, yellow, violet, purple or red. Calyx 5-lobed. Corolla rotate, with 5 nearly equal segments. Stamens 5. All or only the 3 posterior filaments bearded. Capsule 2-valved, many-seeded. The species are numerous, and there are several forms known to be natural hybrids. They are confined to the north temperate and warm regions of the Old World. The generic name is an altered form of the Latin *Barbascum*.

There are five or six indigenous species popularly known by the name of Mullein. *V. Thápsus* is a tall coarse biennial with densely woolly decurrent leaves and dense spikes of yellow flowers. *V. Lychnìtis* has small white flowers; *V. Blattària* is nearly glabrous, with a glandular branched inflorescence of large yellow flowers with purple-bearded filaments; and *V. nìgrum* is pubescent, with angular almost simple stems and smaller yellow flowers with purple bearded filaments.

1. *V. Phœníceum* (fig. 185). — A slender glabrous perennial about 3 or 4 feet high. Flowers violet, rose, or nearly white. A native of the South of Europe, flowering all the Summer.

V. pyramidàtum, *V. undulàtum*, and *V. acuminàtum* are other large-growing yellow-flowered species.

5. CÉLSIA.

A small genus of the same habit and inflorescence as the last, differing merely in having four didynamous stamens. The species inhabit the same regions. Named after Professor Celsius of Upsal.

1. *C. Crètica.*—A showy robust biennial growing from 4 to 6 feet high. Leaves hairy, lyrate-oblong, and the uppermost ovate or lanceolate, toothed. Flowers in a leafy spike about 1½ inch in diameter, yellow with two brown spots near the centre. The filaments of the shorter stamens bearded; the longer stamens and style declinate. A native of Crete, flowering in Summer.

Alonsòa incisifòlia, syn. *Célsia urticæfòlia*, is a tender Peruvian perennial having resupinate showy orange-scarlet flowers with a dark blotch. It may be treated as an annual for the open ground.

6. LINÀRIA.

A large genus of herbaceous or more rarely frutescent plants. Leaves opposite or whorled, the uppermost often alternate. Flowers spicate or racemose, or solitary and axillary. This genus is remarkable for the personate open or closed corolla spurred at the base, with an erect upper lip and trilobate lower lip, the middle lobe smallest. Sometimes the corolla is regular, with 5 spurs and lobes, and 5 fertile stamens. Fertile stamens 4, included. Capsule opening by pores. The species are natives of Europe, North Africa, and West Asia, and about half a dozen occur in this country. *Linarium* is the Latin word for flax plant, and is applied to this genus in consequence of a similarity in the foliage of some species.

1. *L. vulgàris.* Toad-flax.—This is one of our handsomest native plants, producing its long bracteolate racemes of yellow and orange flowers from July to October. It is a glaucous erect perennial about 2 to 3 feet high, with linear or lanceolate glabrescent leaves. The Peloria, or variety with a regular corolla, is more frequently seen in this species than in any other. It is constant, and the one usually cultivated, but it is rare in the wild state.

2. *L. Dalmática.*—A tall perennial from 3 to 4 feet high.

Leaves glaucous, sessile, ovate, acute. Flowers racemose, very near those of the preceding species, appearing in Summer. South of Europe.

L. Macroùra is an allied glaucous perennial with yellow and orange flowers, remarkable for the very long spur. It is a native of the Crimea.

3. *L. triornithóphora.*—A handsome though somewhat tender perennial from Portugal, but which will flower well if treated as an annual. It grows from 1 to 2 feet high, producing its flowers where it will succeed as a perennial throughout the Summer and Autumn. Leaves glabrous, ovate or lanceolate, usually in whorls of threes, with a stalked flower from the axil of each. Flowers large, purple, tinged with yellow on the lower lip.

4. *L. alpìna.*—A dwarf tufted perennial with small linear or lanceolate glaucous leaves and terminal racemes of relatively small lilac-blue flowers with an orange-red lower lip. A native of the mountains of Europe, blooming in Summer.

5. *L. purpùrea.*—A tall erect somewhat slender perennial from 2 to 4 feet high. Leaves glaucous, linear, lower whorled. Flowers in terminal bracteolate racemes, purple, rather small, the spur as long as the tube, produced all the Summer. South Europe.

6. *L. Cymbalària.* Mother-of-thousands.—This is the creeping perennial species with slender stems, miniature Ivy-like glabrous leaves, and small lilac-blue flowers tinged with yellow on the lower lip, now become rather common on walls, old buildings, banks, etc. It is a European species, and frequent though probably not indigenous, in Britain. It produces its flowers in great profusion from May till September.

7. *L. bipartìta.*—An annual species about a foot high with linear glaucous foliage and lilac-purple or pale violet flowers tinged with yellow on the lower lip. There is also a pure white and several other varieties. The specific name refers to the 2-lobed upper lip of the corolla. A native of North Africa.

L. trístis is another annual species with yellow flowers having a purple-brown mouth; *L. spártea* has large bright yellow flowers; and *L. saxátilis* is a trailing plant with yellow flowers. There are many other very pretty species, both annual and perennial, but the foregoing selection includes nearly all that are desirable in the genus.

L. spùria and *L. Elátine* are the two annual species frequently found in cornfields. They are both small-flowered; the former erect with ovate or rounded leaves, the latter prostrate with hastate acute leaves.

7. ANTIRRHÌNUM.

This small genus is very near the last, differing mainly in the tube of the personate corolla being saccate, not spurred at the base, and the throat closed by the bearded palate. The species are found in the same regions. The name is a compound of *ἀντί*, in comparison, and *ῥίν*, a snout, in allusion to the resemblance in the corolla to the face of an animal.

1. *A. màjus* (fig. 186). Snapdragon.—This familiar perennial has been so long in cultivation that it has escaped in numerous localities, and may now be found on old ruins, walls, chalk cliffs, railway banks, etc., and often in great profusion. The varieties in cultivation are numerous and handsome, including pure white, yellow, orange, rosy red, purple, and violet, and others striped or spotted in two or more colours. It is a native of the Mediterranean region.

A. Orόntium is an indigenous dwarf annual with small rosy-purple flowers remarkable for the long narrow sepals which exceed the corolla.



Fig. 186. Antirrhinum majus. (⅓ nat. size.)

8. LOPHOSPÉRMUM.

Half-hardy climbing herbaceous perennials, usually treated as annuals for open-air culture. Leaves hairy, simple, cordate or triangular, coarsely toothed, petiolate. Flowers large, showy, solitary, axillary. Calyx ample, 5-lobed, herbaceous. Corolla tubular-campanulate; limb of 5

spreading lobes. Capsule 2-celled, each cell opening by an irregular pore below the apex. Seeds fringed, whence the name, from λόφος, a crest, and σπέρμα, a seed. There are two or three Mexican species.

1. *L. scándens.*—Leaves deltoid or cordate, irregularly and coarsely toothed, slightly pubescent, petioles long. Flowers glabrous, deep rosy purple. *L. Hendersòni*, with violet-purple flowers striped or spotted with white, is probably a variety.

2. *L. erubéscens.*—A similar plant with large triangular coarsely-toothed hairy leaves and large rosy red velvety flowers.

9. MAURÁNDYA.

Climbing herbaceous plants, like the last, supporting themselves by their twisted petioles. Leaves cordate or hastate. Corolla slightly irregular, tubular-campanulate; limb somewhat unequally 5-lobed. Capsule opening in several valves. The genus was named after Professor Maurandy of Carthagena.

1. *M. Barclayàna.*—An elegant climber with slender stems and petiolate cordate or hastate glabrous leaves. Flowers solitary, axillary, pedunculate, with a glandular calyx. Corolla deep violet, rosy purple, or white. *M. semperflòrens* is a variety with cordate-hastate leaves and somewhat smaller purplish-violet flowers. A native of Mexico.

M. antirrhiniflòra, also from Mexico, has variable leaves and still smaller bright purple, rose, or white flowers.

Rhodóchiton volùbilis is a closely allied plant from the same country with dark purple pendent flowers easily distinguished by the large coloured persistent 5-toothed calyx. The name, referring to this character, is derived from ῥόδος, red, and χιτών, a tunic.

10. PHYGÈLIUS.

A monotypic genus which is closely related to *Péntstemon*, especially in habit. It differs, however, in the long curved corolla-tube, in the barren stamen being reduced to a scale, and in the cells of the capsule being very unequal in size. The name appears to be derived from φυγή, banishment or exile, perhaps from the fact of its being a solitary outlier of this affinity.

1. *Ph. Capênsis.*—A glabrous perennial from 1 to 2 feet high with tetragonal erect simple stems, opposite ovate-lanceolate petiolate leaves, and terminal panicles of rosy-red flowers with a yellow throat. It is a native of South Africa, but not of the Cape Colony as the name would imply.

11. PAULÓWNIA.

This also, as far as at present known, is a monotypic genus. It is a tree of moderate size with very large opposite ovate-cordate deciduous leaves clothed with a greyish woolly tomentum, and terminal panicles of purplish-violet spotted fragrant flowers. It has been referred to *Bignoniàceæ*, but the 4 stamens, albuminous, though winged, seeds, etc., seem to indicate its position in this order. The genus was named in honour of a Russian princess.

1. *P. imperiàlis* (fig. 187).—This is a distinct hardy fast-growing tree, but in consequence of the flowers being formed in the Autumn preceding the Spring when they should expand, they are often destroyed by frost. It is a native of Japan.



Fig. 187. Paulownia imperialis. (¼ nat. size.)

Scrophulària, Figwort, is a genus of tall leafy herbs with terminal narrow cymose panicles of dull-coloured flowers. Two species are common in wet places in this country.

12. COLLÍNSIA.

A small genus of slender branching annuals with opposite or whorled leaves and clustered cymes of showy gaily-coloured flowers in the axils of the upper leaves. Calyx deeply 5-lobed. Corolla-tube saccate at the base on the upper side; limb bilabiate; upper lip bilobate, curved backwards; lower lip trilobate; middle lobe pouch-like, enclosing the 4 stamens. Capsule many-seeded, opening in valves. The species are all

from North America, and chiefly Californian. The genus was dedicated to Zaccheus Collins, an American botanist of note.

1. *C. bìcolor* (fig. 188).—This is the commonest species and one of the best for general purposes. It grows from 1 to 2 feet high with strongly-nerved lanceolate leaves, opposite or in threes. The flowers have the upper lip pale lilac or white, and the lower a deep lilac purple. There is also a variety with quite white flowers.



Fig. 188. Collinsia bicolor. ($\frac{1}{6}$ nat. size.)

C. grandiflòra is a similar plant having rather larger flowers with a purplish lilac upper lip and a deep blue lower lip. *C. múlticolor* has a broad white blotch spotted with crimson on the upper lip; *C. heterophýlla* has the lower leaves trilobate, but otherwise very near *C. bìcolor*, of which it may be a mere variety. *C. vérna* is a distinct species in having the blue and white flowers on long stalks.

13. CHELÒNE.

This genus comprises a few species separated from *Péntstemon* on account of the seeds being winged, the barren stamen shorter than the others, and the inflorescence a close bracteated spike. The species are all North and Central American. Χελώνη is equivalent to tortoise, and is applied to this genus from the resemblance of the inflated corolla to that animal. *Ch. barbàta*, *Ch. gentianoìdes*, *Ch. centranthifòlia*, *Ch. campanulàta*, and *Ch. speciòsa* are true Pentstemons.

1. *Ch. glàbra*, syn. *Ch. purpùrea* and *Ch. oblíqua*.—An erect glabrous perennial about 2 feet high. Leaves nearly sessile, lanceolate, acuminate, serrate. Flowers white, rose or purple, nearly sessile; bracts foliaceous, imbricated. This has several

different popular names in America; as Turtle-head, Snake-head, Shell-flower, Balmony, etc.

2. *Ch. màjor*, syn. *Ch. Lyónsii.*—A very handsome robust species, 3 to 4 feet high, with broadly cordate serrulate-ciliate slightly hairy leaves and large purple flowers.

14. PÉNTSTEMON.

Showy herbaceous perennials with opposite leaves, the upper often sessile and stem-clasping. Flowers in terminal thyrsoid panicles. Calyx deeply 5-lobed. Corolla tubular, more or less inflated and bilabiate. Fertile stamens 4, the fifth sterile one nearly or quite equalling the others. Capsule many-seeded, opening by valves; seeds wingless. An exclusively American genus numbering about fifty species, from the north temperate and subtropical regions. The name is a compound of πέντε, five, and στήμων, a stamen, from the barren stamen being conspicuous.

1. *P. acuminàtus.*—A very distinct species about 18 inches high with lanceolate acuminate glabrous glaucous leaves and reddish purple flowers. Corolla slightly bilabiate, with spreading lobes.

2. *P. barbàtus*, syn. *Chelòne barbàta.*—A very beautiful species. Stems slender, 2 to 3 feet high. Leaves narrow, entire, glabrous. Flowers bright scarlet, rose, or white. Corolla-tube narrow, scarcely inflated, limb distinctly bilabiate, lower lip bearded. In a robust variety called *P. Tórreyi* the lip is not bearded, and the stems attain a height of 6 feet. A native of Mexico, flowering in July.



Fig. 189. Pentstemon diffusus. (½ nat. size.)

3. *P. diffùsus* (fig. 189).—This is a spreading plant from 12 to 18 inches high, with broadly ovate-lanceolate sessile deeply serrate leaves

and a profusion of purplish carmine or violet flowers. Sepals serrate. There are several garden varieties, amongst them one having rosy flowers with a white throat.

4. *P. ovàtus.*—In foliage this species is extremely near *P. diffusus*, but the corolla is more decidedly tubular, only slightly expanded at the mouth, and the lobes erect. Flowers deep violet-blue, slightly freckled.

5. *P. speciòsus.*—A handsome hardy species from 2 to 3 feet high with glaucous spathulate leaves and long narrow panicles of large intense blue bilabiate flowers, produced all the Summer. It is said to be variable from seed, rarely reproducing the beautiful tint of the wild form. California.



Fig. 190. Pentstemon gentianoides. (¼ nat. size.)

6. *P. Wrightii.*—This is another good hardy species from 12 to 18 inches high. Leaves glaucous, entire. Flowers of medium size, rosy carmine. Corolla broadly tubular, with a wide mouth slightly irregular but not bilabiate. A native of Texas.

7. *P. gentianoìdes* (fig. 190).—A very beautiful hardy species from the high mountains of Mexico. It grows about 3 or 4 feet high, bearing long leafy panicles of bright violet-blue or scarlet and white flowers. This must not be confounded with *P. Hartwégii*, which bears the same name in some gardens, and has rather smaller violet-blue flowers shaded with deep blue on the outside. The tube is shorter and more inflated. Possibly they may be varieties of one species, as they are both very variable under cultivation.

8. *P. pulchéllus.*—A showy but rather tender species with sessile linear-lanceolate serrulate glabrous leaves and secund racemes of rosy pink flowers sometimes tinged with purple. Corolla very much inflated, with small nearly regular spreading lobes. A native of Mexico.

9. *P. cordifòlius.*—Another tender Mexican species. It is

a very ornamental somewhat shrubby plant with shortly petiolate ovate-cordate slightly toothed glabrescent leaves and narrow tubular bilabiate orange-scarlet flowers in leafy panicles.

10. *P. Murrayànus.*—This species is remarkable for its ample glaucous perfoliate leaves and tubular nearly regular scarlet and yellow flowers in foliaceous racemes. Mexico.

11. *P. Jaffrayànus.*—A splendid hardy species with glaucous entire leaves and bright blue and red flowers in narrow leafless panicles. California.

12. *P. Digitàlis.*—A very distinct tall-growing hardy species with glabrous sessile stem-clasping lanceolate serrate leaves and branched panicles of white viscous flowers. Corolla bilabiate, inflated, curved, and suddenly constricted into a narrow tube towards the base. Southern States of North America.

Chænóstoma fastigiàtum is a dwarf South African annual with opposite toothed leaves and spikes of rosy purple flowers. The corolla is very much inflated, and includes the didynamous stamens.

Nycterìna Capénsis, also from South Africa, is an annual with white fragrant flowers, opening towards night. The calyx is 2-lipped, and the corolla tubular, and the flowers sessile in terminal spikes.

15. MÌMULUS.

Prostrate or erect annual or perennial herbs with opposite leaves and solitary axillary flowers. Calyx tubular, angled. Corolla bilabiate; upper lip erect or reflexed, bilobate; lower lip trilobate; anthers confluent. Capsule 2-celled, many-seeded. There are about thirty species, from North and South America and Australasia. The name is from μιμώ, an ape, in allusion to the form of the flower.

1. *M. lùteus.* Monkey Flower.—Stems ascending, stout, hollow, glabrous or glandular. Leaves ovate or oblong, 5- or more nerved, coarsely toothed. Flowers yellow with two crimson or purple spots on the lower limb. This species is a native of Chili and California, and produces its attractive flowers all the Summer. It is now frequently seen in waste places, by river-sides, etc., in this country, and is spreading very fast in some localities.

M. variegàtus, syn. *M. rívularis* (fig. 191), and *M. guttatus*,

are considered by some botanists as varieties of *M. lùteus*, and by others as distinct species, and the fact that hybrids between these forms and *lùteus* are frequent seems to strengthen the former supposition. *M. variegàtus* is a Chilian form, having much larger richly coloured flowers irregularly blotched with crimson, maroon, or purple on a yellow or white ground, sometimes uniformly yellow or reddish. *M. guttàtus* is a Californian form very near the last in which the flowers are spotted with purple-brown on a yellow ground. The intermediate varieties of these three forms are numerous and beautiful.



Fig. 191. Mimulus variegatus. (¼ nat. size.)

2. *M. cùpreus.* — This is a dwarfer species with ovate-lanceolate toothed 3-nerved glabrous leaves often tinged with red. Flowers almost regular, copper-coloured, purplish brown or crimson; limb of the corolla velvety and spotted. It is a native of Chili, and has produced many beautiful freckled and spotted varieties.

M. quinquevúlnerus, a closely allied species or variety, is also very variable in the colouring of its flowers. There are varieties with lemon and orange-yellow and white grounds blotched with purple, rose or crimson. It is found in the same country.

3. *M. cardinàlis*, syn. *Díplacus cardinàlis.*—A perennial from 2 to 3 feet high clothed with glutinous hairs. Leaves ovate, stem-clasping. Flowers scarlet or rose, with or without dots in the throat. The lateral reflexed segments of the corolla are lobed. A native of California, flowering in Summer.

4. *M. moschàtus.* Musk Plant.—This favourite little tufted trailer is perfectly hardy. It is readily known from its congeners not only by its agreeable musk scent, but also from its small viscid woolly leaves and relatively small nearly regular yellow flowers. A native of Oregon in North-western America.

16. DĪPLACUS.

This genus is very near the last, but most of the species are woody at the base. The main distinction, however, is in the seed-vessel, which opens in valves with the seed-bearing placentas attached to them. The name is from *δίς*, double, and *πλακοῦς*, a placenta, referring to the separation of the placenta into two parts.

1. *D. glutinòsus*, syn. *Mímulus glutinòsus.*—A robust growing perennial from 2 to 3 feet high, with funnel-shaped almost regular flowers, orange-coloured in the original variety. But since its introduction, about a century since, it has given birth to several marked varieties which have been described as distinct species. They may be reduced to four principal forms: *D. aurantìacus*, orange-coloured flowers, having the lobes of the corolla emarginate; *D. puníceus*, cinnabar flowers with emarginate lobes; *D. latifòlius*, yellow flowers, larger broader leaves, and rounded corolla-lobes; and *D. grandiflòrus*, remarkable for the unusual development of the limb of the corolla, and its deeply bilobate divisions. The colour here is rather variable, ranging in every shade from pure white to nankeen yellow, uniform, or covered with spots. This species is from California, and somewhat tender.

Sibthórpia Europæa is an interesting slender creeping herb with minute reniform hairy leaves and solitary axillary flowers. It is found here and there in the South and West of England and Ireland. This rapidly covers the ground in damp shady places.

17. BUDDLÈA.

A large genus of shrubs, herbs, or even small trees. Leaves opposite, commonly densely tomentose, especially on the under surface. Flowers small, often tomentose, axillary, spicate, capitate, or thyrsoid. Calyx equally 4-toothed. Corolla tubular-campanulate, regular; limb spreading, 4-toothed. Stamens 4, included. Capsule dehiscing septicidally in two valves. About eighty species are known, inhabiting America, Africa, and tropical Asia. The genus was named after Buddle, an English botanist. This and some of the allied genera are now usually referred to *Loganiàceæ*, but having overlooked this genus there we introduce it in its old place.

1. *B. globòsa.*—This is a shrubby species, and the only one at all common in British gardens. Leaves linear-lanceolate,

acutely acuminate, clothed with a dense silvery tomentum beneath, and somewhat rugose above, usually deciduous in our climate. The flowers are small, bright orange, arranged in small globular heads on long peduncles. It is a native of Chili.

2. *B. Lindleyàna.* — A half-hardy shrub with angular glabrous branches, ovate shortly-petiolate serrate leaves, and terminal racemose spikes of purplish red hairy flowers. A native of China.



Fig 192. Digitalis purpurea. (¼ nat. size.)

B. crispa is a very distinct species, from the Himalaya mountains, having very woolly ferruginous cordate-lanceolate toothed or curled leaves and terminal spicate panicles of lilac and brown fragrant flowers, produced in early Spring.

Erìnus alpìnus is a pretty little herbaceous plant from the Alps and the Pyrenees, growing about 3 or 4 inches high. Leaves small, oblong, dentate, radical rosulate. Flowers racemose, reddish-purple. Corolla regular, funnel-shaped; limb of 5 toothed lobes.

Wulfènia Carinthìaca is a dwarf herb with oblong petiolate doubly toothed leaves and bracteolate racemes of pendent tubular blue flowers, appearing in Summer.

18. DIGITÀLIS.

Biennial or perennial herbs, rarely shrubby. Leaves simple, alternate, the lower ones tufted and petiolate. Flowers in long terminal bracteate racemes. Calyx

deeply 5-lobed. Corolla declinate, tubular, irregularly campanulate or ventricose, the lower central lobe being longest. Stamens 4, included; anthers cohering in pairs. Fruit capsular, opening in 2 valves. Upwards of a dozen species have been described, chiefly from the Mediterranean region. The name is from *digitale*, a finger-stall or thimble, the shape of the corolla.

1. *D. purpùrea* (fig. 192). Foxglove.—This common indigenous biennial species is the handsomest of the genus, but it is only suitable for large gardens, shrubberies, or parks, where it may be grown in masses in a semi-wild state. Leaves slightly cottony. Flowers in the common variety purple speckled with ocellated spots; a white and a rosy variety are occasionally seen.

D. Thápsi is a perennial species resembling the last, with decurrent leaves and rather smaller purple spotted flowers on distinct peduncles.

D. ferrugínea, *D. lùtea*, *D. grandiflòra*, and *D. ochroleùca* have rusty creamy or pale yellow flowers, and are only worthy of a place in large collections.

19. VERÓNICA.

Herbs or shrubs, erect or prostrate in habit, with opposite and alternate or rarely whorled leaves. Flowers in terminal spikes or racemes, rarely solitary and axillary. Calyx 4- or 5-lobed. Corolla rotate or campanulate; limb unequally 4-lobed, spreading. Stamens 2, exserted. Capsule compressed or turgid, 2-valved. Seeds rather large. A very large genus, numbering upwards of 150 species, abounding in the temperate regions of the northern hemisphere and in Southern Australasia. Fifteen species are found in Britain. The etymology of the generic appellation is unexplained. The species are known by the English name of Speedwell.

1. *V. spicàta.*—A perennial with erect flowering stems from 1 to 2 feet high, terminated by racemes of bright blue, rose or white flowers. Leaves pubescent, opposite, ovate, oblong, obtuse, sessile or petiolate, serrate or crenate. A native of South Britain, but rare and local. It produces its handsome spikes of flowers freely from June to August.

2. *V. gentianoìdes.*—A pale green perennial about 18 inches high, common in cottage gardens. Leaves opposite, linear, lanceolate, acute, crenate, three-nerved, with a cartilaginous

margin, glabrescent. Flowers in terminal racemes, pale blue with darker lines, appearing in May or June. A native of Asia Minor.

3. *V. saxátilis.*—A dwarf tufted evergreen species with spreading stems somewhat woody at the base. Leaves opposite, dark green, oblong-obovate, crenate. Flowers racemose, blue with darker lines and a white centre. A mountain plant, found in various parts of Europe, including the higher mountains of Scotland.

4. *V. longifòlia.*—A tall variable plant with opposite or whorled ovate-lanceolate leaves, cordate or rounded at the base and doubly toothed towards the apex, and long dense terminal racemes of blue or pink flowers. *V. incarnàta* and *V. marítima* are varieties of this species. It is a native of Central Europe.

We might extend this list considerably, but the species so nearly resemble each other that for general purposes the above will be found sufficient. *V. Teùcrium*, *V. Austrìaca*, *V. amethystìna* and *V. cándida* are occasionally cultivated. *V. Chamædrys*, Cat's-eyes, is one of the prettiest and commonest of native perennial species. It is a creeping hairy plant with ovate-cordate shortly petiolate deeply serrate leaves and axillary racemes of rather larger bright blue flowers. *V. Beccabúnga*, Brooklime, and *V. Anagállis* are fleshy plants growing in wet places. The former has stalked oblong leaves and axillary racemes of blue or pink flowers; and the latter sessile stem-clasping leaves and pale blue or white flowers. In addition to the foregoing we must mention the New Zealand species, of which there are now many beautiful varieties in cultivation, but being rather tender they are more extensively grown for window and conservatory decoration in Autumn and Winter. Nevertheless they will flourish in the open air in the south-west near the sea with slight protection in very severe weather. These are evergreen shrubby species and varieties with axillary racemes of purple, blue, lilac, white, pink or crimson flowers. *V. speciòsa* with glossy oblong entire coriaceous leaves, and *V. salicifòlia* and *V. macrocàrpa* with linear-lanceolate leaves, are the parents of the beautiful hybrid varieties, including *V. Andersòni*, *V. versícolor*, *V. Lindleyàna*, *V. kermesìna*, etc.

Ourísia coccínea is an exceedingly beautiful though rare creeping plant with ascending flowering stems about 6 inches high. Leaves all radical, broadly ovate, cordate, slightly lobed

and toothed. Scapes bracteolate, bearing numerous drooping tubular scarlet flowers. A native of the Andes.

Besides the above enumerated plants of this order there is a large tribe of very handsome plants still almost unknown in cultivation, on account of the difficulties experienced in raising them artificially, due to the fact that they are mostly partially parasitical in the natural state on the roots of the plants they are associated with. This section includes amongst others the genera *Gerárdia*, *Pediculàris*, *Melampỳrum*, and *Castillèja*.

Order LXXIX.—BIGNONIÀCEÆ.

Handsome shrubs or herbs of trailing, twining or climbing habit, or more rarely erect. Leaves usually opposite, compound or simple, exstipulate. Calyx inferior, entire or lobed or spathaceous. Corolla regular or irregular. Stamens 5, of which 4 or only 2 are fertile. Fruit a dry frequently woody capsule, 2-celled with a central placentation, or 1-celled with parietal placentation. Seeds compressed, winged, destitute of albumen. There are about fifty genera, comprising 450 species, for the greater part inhabitants of tropical regions.

1. BIGNÒNIA.

Shrubby climbers with pinnate deciduous often tendrilled leaves and handsome campanulate flowers. Calyx entire or obscurely toothed. Corolla slightly irregular. Fertile stamens 4, with a rudiment of a fifth. Capsule 2-celled, 2-valved, compressed, the partition parallel with the valves. This genus commemorates the Abbé Bignon, librarian to Louis XIV.

1. *B. capreolàta.*—A very handsome glabrous climber with unijugate leaves terminating in a branched tendril, and often provided with two very small leaflets near the base of the petiole. Peduncles clustered, one-flowered. Flowers large, orange. A native of North America from Virginia southwards, and only suitable for warm sheltered situations.

2. TECÒMA.

This differs from *Bignònia* in the convex valves of the capsule being contrary to the partition, and in the leaves being destitute of a tendril. The name is an abbreviation of the Aztec Tecomaxochitl.

T. radìcans (fig. 193), syn. *Bignònia radìcans.*—Trumpet Flower. A tall climber with opposite pinnate leaves, supporting



Fig. 193. Tecoma radicans. (¼ nat. size.)

itself by means of rootlets from the joints. Flowers orange and scarlet, produced in Summer. North America from Pennsylvania southwards. This is the species commonly seen in gardens.

T. grandiflòra is from North-eastern Asia, and resembles the last, but the tube of the corolla is shorter and the throat more open.

3. CATÁLPA.

Erect trees with large simple leaves and terminal panicles of flowers. Calyx bilabiate. Corolla campanulate. Fertile stamens 2 or 4. Capsule long and slender, with the partition contrary to the valves. A small genus occurring in the West Indies, North America, Japan, and China. The name is the Indian appellation for the North American species.

1. *C. bignonioìdes* (fig. 194), syn. *C. syringæfòlia.* Indian Bean.—A handsome small tree with large leaves downy beneath, either opposite or in whorls of threes. Flowers white



Fig. 194. Catalpa bignonioides. (¼ nat. size.)

tinged with violet and speckled with purple and yellow in the throat. The seed-vessel, which is rarely seen in this country, is nearly a foot long. A native of the Southern States of North America. There is a variety with golden foliage.

C. Bùngei is a native of China, of rather smaller stature, with more acuminate glabrous leaves.

4. ECCREMOCÁRPUS.

Climbing herbaceous or shrubby perennials with compound leaves and leaf-opposed racemes of brilliantly coloured flowers. Fertile stamens didynamous. Capsule small, oblong. A South American genus of few species. The name is from ἐκκρεμής, pendent, and καρπός, a fruit, in allusion to the pendulous seed-vessels.

1. *E. scaber* (fig. 195), syn. *Calampèlis scàbra.*—An herbaceous climber with bipinnate leaves and orange and scarlet

tubular flowers. This handsome plant is usually treated as an annual in the open air. It is a native of Chili.

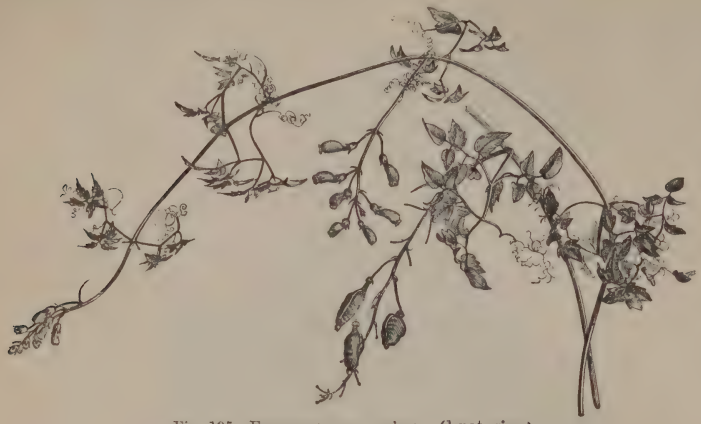


Fig. 195. Eccremocarpus scaber. (½ nat. size.)

Order LXXX.—GESNERÀCEÆ.

This is a considerable order of herbs and shrubs with usually very gorgeous and brilliant flowers, including the genera *Gloxínia*, *Achimènes*, *Æschynánthus*, and *Gesnèra*, of our stoves; but there is only one hardy species in our gardens, viz., *Ramóndia Pyrenàica*, syn. *Verbáscum Mycòni*. The order is characterised amongst the Gamopetalous division by having unsymmetrical flowers and parietal placentation of the ovary; but the little plant alluded to is anomalous in having symmetrical flowers, and hence its position is not undisputed. It is a dwarf mountain plant about 4 inches high with tufted oblong-cordate rugose shaggy leaves and few-flowered bractless scapes. The flowers are purple or lilac with yellow anthers.

Order LXXXI.—PEDALIÀCEÆ.

A small order remarkable for the curious forms assumed by the seed-vessel of different species. In structural arrangements it hardly differs from the last. The only genus we are familiar with in cultivation is *Martýnia*. The species are of annual duration, branching from the base, and clothed with clammy hairs. Leaves simple, cordate-oblong or rotundate. Flowers

large, in short racemes. Corolla campanulate, gibbous below. Fertile stamens 2 or 4. The fruit, at first soft, is ultimately a woody wrinkled 4-celled capsule, terminated by a long curved beak. Seeds few and large. *M. proboscídea*, Unicorn Plant, has blue flowers; *M. lùtea*, yellow; and *M. frà̀grans* has crimson-purple fragrant flowers. All of these are of American origin.

Order LXXXII.—ACANTHÀCEÆ.

Herbs (or more rarely shrubs) with opposite rarely verticillate simple entire or lobed leaves. Flowers usually in bracteolate spikes or racemes. Calyx inferior, 4- or 5-lobed, sometimes very small, and occasionally obsolete. Corolla ringent or bilabiate, the lower lip overlapping the upper in bud, rarely 1-lipped. Stamens usually 2, sometimes 4, and didynamous. Capsule two-celled, two-valved; valves opposite the partition. Seeds exalbuminous, 2 or more in each cell, attached to a woody placenta which splits through the axis and adheres to the valves. There are about 150 genera and 1500 species, nearly all tropical.

1. ACÁNTHUS.

Herbaceous plants, remarkable for the beauty of their foliage rather than their flowers. Leaves pinnatifid or bipinnatifid and toothed. Flowers in leafy spikes terminating the stem. Calyx unequally 4-lobed, sometimes spinescent. Corolla having only one lip, the inferior, developed. Stamens 4. Cells of the capsule 2-seeded. The three or four species described are from the shores of the Mediterranean Sea. Ἄκανθα signifies spine or thorn, and was applied to the prickly species by the ancients. It is recorded that the foliage of these plants furnished the idea for decorating the capitals of the Corinthian order of architecture.

1. *A. spinòsus* (fig. 196). Bear's Breech.—Stems about 3 feet high. Leaves and bracts very prickly. Flowers purplish and white, appearing in Summer. *A. spinosíssimus* scarcely differs, but the flowers are larger.

2. *A. móllis*.—This is a similar plant, but the teeth of the leaves, though acute, are not prickly. *A. latifòlius* is a variety of this. Flowers white, pink or pale blue. *A. longifòlius* is distinguished by its longer leaves, narrower in outline, and crimson flowers.

Thunbérgia alàta is a very handsome perennial from India and Africa, which is ordinarily treated as annual. It is a twining plant with hastate petiolate leaves, the petioles winged,



Fig. 176. Acanthus spinosus. (¼ nat. size.)

and solitary axillary pedunculate nearly regular flowers with a broad spreading limb. They are variously coloured: either white, buff, pale yellow or orange, with a purplish-black centre, or uniformly orange or white.

Diánthera Americàna, Water Willow, is a pretty North American aquatic perennial 1 to 2 feet high with linear-lanceolate glabrous leaves and axillary long-stalked dense spikes of purplish bilabiate flowers. It is peculiar in having the anther-cells of the two stamens placed one below the other.

Order LXXXIII.—VERBENÀCEÆ.

Shrubs or herbs with opposite or verticillate exstipulate leaves. Flowers corymbose, spicate or capitate, rarely solitary. Calyx tubular, persistent, inferior. Corolla deciduous, irregular, often 2-lipped. Stamens 4 and didynamous, or only 2. Style terminating the ovary. Fruit 2- or 4-celled, nucamentaceous or drupaceous; cells 1-seeded. There are between 40 and 50 genera and about 600 species, common in the tropics, but rare in temperate regions.

1. VERBÈNA.

Annual or perennial herbs or undershrubs with opposite or whorled simple pinnatifid or lobed leaves. Calyx ribbed, irregularly 5-toothed. Corolla salver-shaped; tube often curved; limb regular, spreading, or more or less bilabiate. Stamens 4, included. Fruit splitting into four 1-seeded nutlets. The species are estimated at about 70, nearly all of which are American. We have, however, one common European species which extends to England, and is especially abundant in the south. It is the *V. officinàlis*, Vervain, a slender plant from 1 to 3 feet high with opposite oblong pinnatifid or tripartite leaves and elongating bracteolate



Fig. 197. Verbena Aubletia. (¼ nat. size.)

dense spikes of small lilac flowers. The generic name is of classical origin, but the signification is obscure.

1. *V. Aublètia* (fig. 197).—This handsome plant appears to have been the first species introduced of those which have contributed to the brilliant array of hybrids now in cultivation. A hairy plant having deeply-cut trilobate leaves and rosy-purple flowers. It is a native of North America and of annual duration, introduced in 1774. *V. Drummóndii* is a variety of this.

2. *V. chamædrifòlia*, syn. *V. Melíndres* and *V. melissoìdes.*—A South American perennial species of creeping habit with regularly toothed not laciniate leaves and umbellate reddish violet flowers in the variety first introduced. 1827 is the date recorded of its introduction. *V. teucrioìdes*, from the same country, is probably a natural variety of this species with white or rose-coloured fragrant flowers.

This species is believed to be the principal parent of the garden varieties, though the typical plant is lost in the maze of hybrids. It is, however, probable that several species or natural varieties are variously blended and intermixed in the garden forms. *V. incìsa* is a very beautiful allied plant from South America with ovate-lanceolate irregularly toothed petiolate leaves and long-stalked umbels of pale red flowers. Some of the hybrid varieties in cultivation are perhaps due to crosses between *V. incìsa* and *V. chamædrifòlia.*

3. *V. pulchélla*, syn. *V. ténera.*—A distinct perennial species of creeping habit with square stems and deeply-cut leaves, and smaller heads of smaller flowers. The divisions of the leaves are narrow and distant, and the flowers usually variegated in two or three colours. The variety *Mahonétti* with striped flowers belongs here. It is a native of South America, and was introduced in 1827.

It is almost superfluous to allude to the numerous varieties further than to remark that they exhibit every shade and tint of lilac, purple, pink, scarlet, and crimson, and also pure white. They are for the greater part uniformly coloured, but there are some handsome striped and bordered varieties.

V. venòsa is a hardy herbaceous species from South America of erect habit, with sessile entire somewhat rugose leaves and elongating heads of violet or bluish violet flowers. *V. alàta* has a branched inflorescence, and is remarkable for its deeply 4-winged stems.

The genus *Lantàna* consists chiefly of South American

shrubs and herbs having opposite simple leaves and axillary pedunculate heads of small variously-coloured flowers. The fruit is 2-celled and drupoid. For bedding purposes some of the perennial species are treated as annuals. *L. Camàra* is the variable species commonly seen, with changeable flowers, yellow, white, orange, red, lilac, and intermediate tints, arranged in dense hemispherical heads.

2. LIPPIA.

A large genus of American herbs and shrubs, only one of which concerns us. The distinctly bilabiate corolla, included stamens, and 2-celled capsule are the principal characters. The genus was dedicated to Lippi, an Italian botanist.

1. *L. citriodòra*, syn. *Alóysia citriodòra*, and *Verbèna triphýlla*. Lemon-scented Verbena.—This favourite deciduous shrub is generally grown as a pot plant, but it will thrive and form large bushes in the South-west of England. It has slender branches and pale-green agreeably-scented lanceolate leaves arranged in whorls of threes. The flowers are very small, whitish or lilac, in terminal panicles. Chili.

Lippia nodiflòra, syn. *Zapània lanceolàta*, etc., Fog-fruit, is a tufted creeping plant from North America with spathulate or cuneate serrate leaves and axillary pedunculate bracteolate capitules of pale blue flowers.

The showy genus *Clerodéndron*, having simple leaves and terminal panicles of brightly coloured pentamerous flowers with exserted stamens and style, and 4-celled ovaries and fruits, furnishes one or two nearly or quite hardy species for the warmer parts of the south-western coast. But they are almost unknown out of the stove or greenhouse.

C. fœtidum, syn. *C. Búngei*, a native of Northern China, will bear our ordinary winters with impunity. It is a handsome shrub armed with short scattered spines. Leaves ample, pubescent, cordate-acuminate, toothed, on slender petioles. Flowers lilac-rose, in dense terminal corymbs.

Callicárpa Americàna, French Mulberry, is a North American dwarf tender shrub with ovate-oblong toothed leaves silvery beneath with a scurfy tomentum, and small flowers in axillary cymes, succeeded by violet-coloured berries, which constitute its chief attraction.

3. VITEX.

A considerable genus of trees and shrubs. Leaves digitately compound or simple. Inflorescence terminal or axillary, paniculate or cymose. Calyx 5-toothed. Corolla salver-shaped; limb oblique, 5- or 6-lobed, obscurely 2-lipped. Fruit dry, 4-celled. The majority of the species are tropical, a few reaching the Mediterranean Sea and China. A classical name applied to a Willow, or some other shrub with flexible branches.

1. *V. Ágnus-Cástus.* Chaste-tree.—An aromatic shrub 6 to 12 feet high. Leaves digitately 5- to 7-foliolate; leaflets lanceolate-acuminate, quite entire, and clothed with a white tomentum on the lower surface. Flowers small, violet, in terminal interrupted paniculate spikes. A native of the South of Europe.

Order LXXXIV.—LABIÀTÆ.

Herbaceous or shrubby plants, frequently furnished with immersed glands of aromatic fragrant oil. Stems usually 4-angled. Leaves opposite or verticillate, simple or compound. Flowers in axillary cymes or solitary or capitate. Calyx inferior, tubular, ribbed, 5- or 10-toothed or bilabiate. Corolla usually bilabiate, the upper lip overlapping the lower in bud. Stamens 4 and didynamous, or only 2. Fruit composed of 4 (rarely fewer) 1-seeded nutlets enclosed in the persistent calyx. Seeds erect, with little or no albumen. A very large and very natural assemblage of plants, comprising about 2,500 species, chiefly inhabiting temperate and tropical countries. The order is abundantly represented in Britain and in the herb garden. Sage, *Sálvia officinàlis*; Spearmint, *Méntha víridis*; Peppermint, *M. piperìta*; Thyme, *Thýmus vulgàris*; Marjoram, *Oríganum vulgàre*; and Basil, *Ocýmum Basílicum*, are amongst the most familiar.

1. CÒLEUS.

A genus of tropical herbs and shrubs, valuable for the brilliantly-coloured foliage of the species in general cultivation. The flowers are small and inconspicuous, and borne in terminal spikes of verticillasters. Calyx campanulate; limb 5-toothed or bilabiate, recurved in fruit. Corolla with a

slender tube and bilabiate limb, upper lip 3- or 4-lobed, lower lip entire, frequently concave, and enclosing the stamens. The species are natives of tropical Asia and Africa, and consequently tender, and only suitable for sheltered warm gardens in Summer. The name is derived from κώλεος, a sheath, the filaments being united at the base.

C. Blùmei, from Java, appears to have been the first introduced of the set with ornamental foliage. It is an erect rather succulent herbaceous plant with large ovate-acuminate toothed leaves of a pale green marbled or spotted with purple-brown, and small blue and white flowers. Somewhat recently two other species or forms have been introduced from the Pacific Islands, namely, *C. Veitchii* and *C. Gibsòni*. The foliage of these is variegated with crimson, purple, and green, and by intercrossing these with *C. Blùmei* in various ways, many very magnificent varieties have been obtained. In some the colours are of dazzling brightness, and beautifully contrasted. Some of the first were raised in the gardens of the Horticultural Society at Chiswick; and now every year produces its quota of new ones.

2. LAVÁNDULA.

Dwarf compact branching shrubs. Leaves opposite, entire or toothed. Flowers small, on long-stalked spikes. Calyx ovate, ribbed, unequally toothed. Corolla with a 2-lobed upper, and 3-lobed lower lip. Stamens and style concealed in the corolla. A small genus of plants from the Mediterranean region. The name is derived from *lavare*, to wash, in allusion to the use of the plant by the ancients to perfume their baths.

1. *L. vèra*. Common Lavender. — A variable undershrub with narrow lanceolate entire hoary or nearly glabrous leaves and terminal verticillate spikes of small blue flowers on a very long peduncle. *L. Spìca* closely resembles *L. vèra*, and is perhaps a form of the same species. It differs, according to Decandolle, in its dwarfer habit, whiter tomentum, leaves crowded towards the base of the branches, and shorter denser flower-spikes.

L. lanàta belongs to the same group, but the leaves are broader, and clothed on both sides with a thick velvety white tomentum. *L. Stœchas* and *L. dentàta* are handsome species belonging to a group distinguished by the dense spikes being surmounted with a crown of coloured foliaceous bracts. The former has narrow entire, and the latter finely-toothed leaves.

Perílla Nankinénsis is an annual from China with ample deep purple foliage. The almost regular rose-coloured flowers are small and insignificant.

The genus *Méntha*, distinguished by the axillary or spiked verticillasters of small nearly regular flowers with four almost equal spreading stamens, offers little that is ornamental, though the fragrance of some of the species might entitle them to a place in the flower-garden. *M. piperìta*, Peppermint, is a sub-erect plant with glabrous oblong-lanceolate serrate petiolate leaves, and spicate inflorescence. *M. Pulègium*, Pennyroyal, is prostrate, creeping, with small ovate-oblong serrate leaves and clusters of flowers in the axils of the lower leaves. *M. rotundifòlia* is an erect plant with roundish crenate wrinkled sessile woolly leaves and dense terminal spikes of white or pink flowers, of which there is a good variety with variegated foliage.

3. SÁLVIA.

A very large genus of undershrubs and herbs of diverse habit. Calyx tubular-bilabiate, upper lip entire or tridentate, lower bifid; throat naked. Corolla bilabiate; throat naked, hairy or tuberculate; upper lip erect, entire or bifid; lower lip trilobate, lateral lobes spreading. Stamens 2; anther-cells distant, one fertile and the other sterile. Nutlets usually smooth and shining. The number of species is estimated at 400. They are found in most temperate and tropical countries, and are particularly numerous in the warmer parts of America. We have two indigenous species, one, *S. Verbenàca*, being tolerably common. This has small violet-blue flowers remarkable for the short upper lip of the corolla. *S. praténsis* has conspicuous bright blue flowers, but it is exceedingly rare in Britain, and probably an introduced plant, as it has long been cultivated in gardens. The generic name is from *salvare*, to save, from the reputed medicinal properties of some species.

1. *S. pàtens* (fig. 198).—This splendid perennial plant is not perfectly hardy, but very desirable on account of the intense rich blue of its velvety flowers. Unfortunately it is of rather straggling habit. It is a native of Mexico.

2. *S. chionántha*.—An erect perennial about 2 feet high with oblong-oval shaggy leaves and very handsome spikes of large pure white flowers, appearing towards the end of Spring. Native of Asia Minor.

3. *S. verticillàta.*—This is a robust species from 3 to 4 feet high. Leaves ovate- or somewhat triangular-cordate at the base and irregularly toothed or lobed. Flowers blue, numerous, in long whorled spikes. Corolla-tube naked. A very hardy species from Central Europe, blooming in July and August.

4. *S. glutinòsa.*—Another hardy European species about a yard high, the younger parts clothed with glandular viscid hairs. Leaves cordate-hastate, acuminate, coarsely serrate. Flowers pale yellow spotted with brown, about six in a cluster. Corolla-tube naked. This blooms from June to August.



Fig. 198. Salvia patens. (¼ nat. size.)

5. *S. splèndens.*—A tender shrubby species with ovate-crenate glabrescent leaves on long petioles and bright scarlet flowers remarkable for the coloured calyx. South America.

6. *S. Forskœhlii.*—This is a hardy herbaceous species with rather naked stems about a foot high, and tufted radical hairy obovate auricled leaves, and purple, blue or violet and white flowers, produced all the Summer. A native of the Levant.

S. argéntea has fine large ovate leaves clothed with a beautiful silvery down, and white flowers of short duration. South Europe. *S. bìcolor* is a tall species from North Africa, with white and violet flowers. *S. coccínea*, a native of South America, has small bright scarlet flowers. *S. bracteàta* has small purple flowers and conspicuous coloured bracts; it is a native of Russia. *S. Hórminum* is another species with coloured bracts and blue flowers, from the Pyrenees.

4. ROSMARÌNUS.

A genus of one South European species, a familiar shrub in gardens. It is technically distinguished by its coloured bilabiate calyx and corolla with two exserted stamens having a reversed tooth on each filament. The name is a compound of *ros*, dew, and *marinus*, sea.

1. *R. officinàlis.* Rosemary.—A dense branching shrub with linear sessile leaves, the edges recurved. Flowers pale blue or white. There are several varieties distinguished by name: as *R. off. latifòlius*, *R. off. fòliis aùreis*, and *R. off. fòliis argênteis.*

The genus *Thỳmus* offers little in the ornamental way, but most of the species are agreeably fragrant, and will thrive in dry rocky places; some of the variegated varieties, as *T. citriodòrus variegàtus*, of nurserymen, are very neat.

5. MONÁRDA.

A small genus of erect herbs with simple toothed leaves and showy flowers in close heads of whorls surrounded with bracts. Calyx tubular, elongated, nearly equally 5-toothed. Corolla long and slender, deeply bilabiate; lips narrow, nearly equal and slightly toothed. Stamens 2, ascending, the spreading anther-cells confluent at the junction. The species are all from North America. Dedicated to Monardez, a Spanish botanist.



Fig. 199. Monarda didyma. ($\frac{1}{3}$ nat. size.)

1. *M. didyma* (fig. 199). Oswego Tea or Bee Balm.—A slightly hairy perennial about 2 feet high with showy scarlet or bright red flowers and bracts. This flowers in Summer, and is by far the showiest in cultivation. The detached corolla in the cut is about one-quarter of the natural size.

M. fistulòsa, Wild Bergamot, has narrower leaves and smaller purple, pink or white flowers.

Prunélla grandiflòra is very near our native Self-heal, *P. vulgàris*, but the flowers are much larger. There are purple, violet, and white varieties. This genus is distinguished by its

dense bracteate spikes or heads of flowers, in which the upper lip of the corolla is large and concave, nearly equalling the four stamens.

6. SCUTELLÀRIA.

Slender herbs or more rarely shrubby, with simple leaves. Flowers axillary and solitary or geminate, or terminal and spicate or racemose. Calyx bilabiate, lips entire, ultimately closing over the fruit, and the upper one furnished with a helmet-shaped appendage which enlarges as the fruit is advancing towards maturity. Corolla-tube long, curved, dilated at the throat, naked within; upper lip entire or notched; lateral lobes of the lower lip usually connected with the upper, the central one spreading. Stamens 4; anthers cohering in pairs. A large genus, abundant in America, and scattered throughout the northern temperate regions. The genus is represented by two species in Britain, *S. galericulàta* and *S. mìnor*; the former, common in England, has blue flowers; and the latter is a rather rare plant of very slender habit, with small pale pink flowers. They are known under the popular name Skull-cap. The generic name is from *scutella*, a dish, in reference to the form of the calycinal appendage.

1. *S. macrántha.*—A pretty perennial, usually less than a foot high. Leaves lanceolate, obtuse, ciliate. Flowers showy, violet-blue, in alternate axillary pairs, produced throughout the Summer. A native of Siberia.

2. *S. alpìna.*—Of about the same stature as the last, with nearly sessile ovate-cordate toothed hairy leaves. Flowers in dense terminal spikes, wholly purple, or the lower lip of the corolla white or yellowish. A native of the mountainous parts of Europe and Asia, producing its flowers freely all the Summer.

3. *S. Japónica.*—A creeping species with obovate-spathulate leaves narrowed towards the base into a short petiole. Flowers in terminal spikes, bright blue or white. A profuse blooming plant from Japan.

S. villòsa, from the Andes of Peru, has dense terminal spikes of showy scarlet flowers, and is rather tender. There are several other interesting hardy species, but the greenhouse species from Mexico greatly exceed them in the size and brilliancy of tl eir flowers.

7. NÉPETA.

A large genus of perennial herbs, for the greater part rather unattractive. Flowers axillary or terminal. Calyx tubular, 15-ribbed, 5-toothed, equal or unequal. Corolla-tube narrow, dilated and naked at the throat; upper lip straight, bifid; lower lip trifid; central lobe largest. Stamens 4, ascending under the upper lip, anther-cells diverging. Nutlets smooth. The species are estimated at upwards of 100, from the temperate and warm regions of the northern hemisphere. We have two indigenous species: *N. Catària*, Catmint, and *N. Glechòma*, syn. *Glechòma hederàcea*, Ground Ivy. Probably the former is not truly native, as it seems to be found only in the vicinity of ancient buildings and gardens. The Ground Ivy is a common plant in England, and one of our earliest Spring flowers. The name is of Latin origin and was applied by the ancients to some plant of this order. It is supposed to be derived from Nepete, a city in Tuscany.

1. *N. Mussìni.*—This appears to be the correct name of the species in general cultivation under various names. It is the species employed for bedding purposes. Different varieties bear the names *macrántha*, *longiflòra*, etc. It grows from 1 to 3 feet high, with oblong-cordate obtuse hoary toothed leaves, and flowers of some shade of blue according to the variety, in leafy spikes of whorls, lasting for a considerable time. It is found in various parts of Asia Minor and Siberia.

8. DRACOCÉPHALUM.

Annual or perennial herbs with opposite leaves and spiked or capitate bracteate whorls of flowers. Calyx tubular, straight, 5-toothed, the upper tooth usually largest. Corolla-tube inflated at the throat; limbs bilabiate, upper lip concave, lower lip 3-lobed. Stamens 4. There are about thirty species, in temperate and warm regions of the north. The name is a compound of δράκων, a dragon, and κεφαλή, a head, literally dragon's head, from the shape of the corolla.

1. *D. peregrìnum.*—A handsome decumbent perennial species. Leaves lanceolate, remotely toothed and mucronate, tomentose beneath. Flowers violet-blue, spotted on the lips, solitary and axillary, appearing in Autumn. A native of Siberia.

2. *D. Argunénse*, syn. *D. Altaìcum.*—This is a more erect

species, from 1 to 2 feet high, with lanceolate entire glabrous leaves and large blue flowers in spikes of whorls. A native of Siberia, flowering in Summer.

3. *D. Moldàvicum.*—A fragrant annual about 18 inches high. Leaves oblong-lanceolate, sharply-toothed. Flowers small, blue, in the axils of the upper leaves.

D. Ruyschiànum has also small blue flowers with hairy calyces.

Cedronélla is very near the last genus, except that the anther-cells are parallel instead of diverging. *C. càna* is a hoary perennial with small ovate-cordate leaves and bright red flowers; *C. Mexicàna* a more robust species destitute of hoary down, with interrupted spikes of less brightly-coloured flowers. Both are natives of Mexico.

Melíttis Melissophýllum, including *M. grandiflòra*, Bastard Balm, is one of our handsomest native Labiates. It is an erect perennial with ovate-oblong crenate slightly hairy leaves and few-flowered axillary whorls of white and pink or purple showy flowers. The variety *grandiflòra* is very handsome. This plant is remarkable for the large campanulate membranous calyx and nearly flat upper lip of the corolla. It is only found in the southern parts of England.

9. PHYSOSTÈGIA.

Tall perennials with rather showy flowers remarkable for the inflated calyx and inflated bilabiate corolla enclosing four stamens. The species are natives of North America and Asia. The name is from *φῦσα*, a bladder, and *στέγω*, to cover, in allusion to the inflated flowers.

1. *Ph. imbricàta.*—A showy perennial from five to seven feet high. Cauline leaves sessile, lanceolate, acute, glabrous. Flowers in terminal bracteate spikes, pale purple, spotted on the lower lip. A native of Texas, blooming in Autumn.

Ph. speciòsa, from Siberia, has pink flowers; and *Ph. Virginiàna* has lilac-purple or white flowers and linear-lanceolate leaves.

10. LÀMIUM.

Annual or perennial hairy decumbent herbs with axillary or terminal bracteate whorls. Calyx tubular-campanulate, 5-toothed. Corolla-tube naked, or with a ring of hairs within the dilated throat; upper lip deeply concave, lower 3-lobed. Stamens 4; anthers cohering in pairs, cells divergent. Nutlets

triquetrous. There are between thirty and forty species, in temperate Europe, Asia, and North Africa. The generic name is a modification of λαιμός, throat, the form of the corolla. There are several indigenous species. The commonest, *L. álbum*, is a perennial with large white villous flowers produced from early Spring till Autumn. *L. Galeóbdolon*, Yellow Archangel, is a handsome herb, plentiful in the South of England. It is hispid and glabrescent, with Nettle-like leaves and axillary whorls of showy yellow flowers spotted with reddish brown, appearing in May and June. *L. purpùreum* is an exceedingly common annual weed on cultivated grounds. *L. maculàtum* is very near *L. álbum*, with smaller foliage spotted or banded with white, and purplish flowers. This is the only one commonly seen in gardens, and it is occasionally found in waste places as a straggler from cultivation.

Leonùrus Cardìaca, Motherwort, is a perennial herb from 2 to 3 feet high with deeply-lobed leaves and crowded whorls of purplish flowers having sharply-toothed calyces. Formerly cultivated, and now occasionally found in waste and neglected places.

11. STÀCHYS (including *Betónica*).

Herbs or undershrubs with toothed leaves and terminal racemes or spikes of flowers. Calyx nearly equally 5-toothed. Corolla-tube not dilated at the throat; and usually furnished with a ring of hairs inside; upper lip erect or spreading; lower lip longer, 3-lobed, the lateral lobes often reflexed. Stamens 4, the lower pair longer. This is a large genus, numbering nearly 150 species; found in temperate and warm regions. The name is from στάχυς, an ear or spike, the form of the inflorescence. There are several native species. *S. Betónica*, Wood Betony, is a common plant in England. It is a tall herb with dense terminal bracteate spikes of reddish purple flowers. *S. sylvática* and *S. palústris* are also tolerably common.

1. *S. lanàta.*—This is the species employed in bedding for its tufted silvery foliage, which is densely clothed with a silky tomentum. The flowers are small and inconspicuous. A native of South-eastern Europe and Asia Minor.

S. coccínea is a South American species about 3 feet high, with cordate toothed hairy leaves and brilliant scarlet flowers in spikes of whorls.

12. PHLÒMIS.

Herbs or shrubs with dense whorls of showy flowers. Calyx tubular, truncate, or 5-toothed. Upper lip of the corolla arched; the lower one spreading, 3-cleft. Stamens 4, the filaments of the upper pair with an awl-shaped appendage at the base. A small genus from the Mediterranean region and temperate Asia. The origin of the generic name is obscure, but is said to come from *φλογμός*, a flame, in consequence of the down of some species having been used for wicks.

1. *Ph. fruticòsa.* Jerusalem Sage.—A handsome shrubby species with lanceolate-ovate or oblong crenate acute leaves clothed with a yellowish down. Flowers yellow, in large axillary whorls or verticillasters in the axils of the upper leaves. A native of the South of Europe, flowering in Summer.

2. *Ph. Hérba-vénti.* Wind Herb.—An herbaceous perennial from 1 to 2 feet high. Leaves thick, oblong-lanceolate, toothed and hairy. Flowers purple and violet; corolla villous outside; calyx-teeth rigid and sharp. Also a native of the South of Europe.

Ph. tuberòsa has purple flowers in which the upper lip of the corolla is bordered with a slender white fringe. *Ph. Russelliàna* is clothed with a white down and has large whorls of yellow flowers.

13. EREMOSTÀCHYS.

A small genus of herbs with pinnate or pinnatifid leaves, distinguished by the upper lip of the corolla being elongated and narrowed at the base and hairy on the outside, and the lower lip with three spreading lobes. The species are natives of the Levant and North-western India. Name from *ἔρημος*, solitary, and *στάχυς*, a spike.

1. *E. laciniàta.*—A striking plant from 3 to 4 feet high with hairy pinnate leaves. Leaflets irregularly lobed and toothed. Flowers in a terminal bracteate spike, purple and yellow. A native of Western Asia, flowering in Summer.

E. Ibèrica, from the same country, has less hairy leaves and yellow flowers.

14. TEÙCRIUM.

Herbs or undershrubs with the flowers in bracteate spikes or racemes of whorls. Calyx tubular-campanulate, equally or unequally 5-toothed. Corolla-tube short, naked within; limb unequally 5-lobed, the 2 uppermost very short, and the central

one of the 3 lower ones largest and elongated. Stamens 4, exceeding the corolla, the lower 2 longest. The species are numerous and widely dispersed. One, *T. Scorodònia*, Wood-Sage, is a common British plant. It has Sage-like leaves and one-sided terminal racemes of small yellowish white flowers. Two or three other species are met with in some parts of England, but they are very rare, and probably escapes from old gardens, having been formerly cultivated as medicinal herbs, under the name of Germander. The generic name is of a classical origin.

1. *T. Hyrcánicum.*—An erect hairy perennial from 1 to 2 feet high with cordate-ovate irregularly toothed leaves and terminal spikes of reddish purple flowers. A native of Persia.

T. Pyrenàicum is a distinct species with rotundate crenate petiolate leaves and clustered terminal purple and white flowers.

Ajuga réptans, common Bugle, is exceedingly abundant in many parts of Britain. It is a creeping almost glabrous plant with ovate crenate leaves and loose bracteate spikes of blue, white or reddish flowers, in which the short upper lip of the corolla is nearly entire. Some of the varieties are grown in gardens.

Order LXXXV.—LENTIBULARÌNEÆ.

A small group of aquatic and marsh herbs with radical or whorled entire or deeply cut often bladdery leaves. Flowers scapose, solitary, spicate or racemose. Calyx inferior, persistent, bilabiate or regularly 5-toothed. Corolla deciduous, personate or bilabiate. Stamens 2, opposite the lateral sepals, inserted on the corolla or hypogynous. Capsule 1-celled; seeds minute and numerous, attached to a free basal placenta. This order contains 4 genera and about 150 species. There are two British genera, which may be introduced into the garden as objects of curiosity. *Pinguícula vulgàris*, Butterwort, is a bog plant with rosulate entire radical leaves and erect axillary one-flowered naked scapes. The flowers are purplish, with a ringent spurred corolla and stamens inserted at the base of the tube. The variety *grandiflòra* is the handsomest. The generic name is from *pinguis*, fat, from the appearance of the foliage. *Utriculària* is a genus of floating herbs with divided vesiculate leaves and personate spurred

yellow flowers having the stamens inserted at the base of the lower lip. There are three species found in Britain, but neither of them is common. Name from *utriculus*, a bladder, in allusion to the leaves.

Order LXXXVI.—PRIMULÀCEÆ.

Perennial or annual herbs, rarely shrubs, many of them bearing handsome brightly-coloured flowers. Leaves usually all radical, but when cauline opposite or whorled and exstipulate. Calyx inferior, regularly 5-lobed, or less frequently 4- to 9-toothed. Corolla regular, hypogynous, rotate, campanulate or infundibuliform. Stamens inserted on the corolla-tube and opposite its lobes. Capsule 1-celled, splitting in valves or transversely; seeds attached to a free central placenta, albuminous. There are about 25 genera and 200 species, chiefly from temperate and cold regions.

1. PRÍMULA.

Tufted perennials with crowded radical leaves and scapose umbellate flowers. Calyx tubular-campanulate, 5-toothed, usually persistent. Corolla salver-shaped, erect or spreading. Capsule splitting into 5 entire or bifid valves. About fifty species are known, mostly European and Asiatic, a few extending to North America. The name is derived from *primus*, first, from the early flowering season of the species originally described.

1. *P. vulgàris*, syn. *P. acaùlis*. Primrose.—This plant is so well known that we need do no more than point out the differential characters. This is necessary, because the species have been confused, and because some of the cultivated forms appear to be intermediate between this and the next. Leaves tufted, sessile. Umbel sessile, giving the pedicels the appearance of being solitary. Calyx-tube inflated, angled; lobes acuminate. Corolla usually pale yellow, with a flat limb. The variety *caulèscens* (*elàtior* of early English botanists), and commonly known as the Oxlip, has the umbel stalked and the calyx villous; but the true *P. elàtior* is only found in the eastern counties, and there sparingly. This is said to differ from the variety *caulèscens*, and hybrids between *P. vulgàris* and *vèris*: from the former in the less inflated calyx, inodorous flowers, and capsule longer than the calyx-tube; and from the

hybrids in the more villous calyx, paler flowers, and absence of folds at the mouth of the corolla-tube.

2. *P. vèris*, syn. *P. officinàlis*. Cowslip.—This is readily known by its leaves being more narrowed towards the base, the calyx-lobes being obtuse, and by the corolla-limb being cup-shaped and deeper coloured.



Fig. 200. Primula variabilis. (¼ nat. size.

The cultivated varieties, either natural or hybrid, which are generally referred to the two preceding species, are numerous. The Polyanthus, *P. variábilis* (fig. 200), is intermediate in character, but its origin is not known with certainty. However, as some of the forms approach the Cowslip, and some the stalked variety of the Primrose, there seems to be little doubt that it is a fertile hybrid between these two



Fig. 201. Primula Sinensis. (¼ nat. size.)

species, if indeed they are entitled to that rank. The colouring

is endless in its variations, though limited to various shades and combinations of purple, red, and yellow. There is a curious variety called the Hose-in-hose, remarkable for the calyx being an almost exact counterpart of the corolla. Another race of cultivated varieties belongs to the Primrose, agreeing with that in having the flower-umbels sessile. The flowers are larger, however, in the so-called typical form, and hence it has received the name *grandiflòra*. The varieties in cultivation are more or less double, and range from nearly pure white, yellow and lilac to deep crimson.

3. *P. Sinénsis* (fig. 201). Chinese Primrose.—This species is almost hardy, or perhaps quite in favoured localities of the South-west. In cultivation it is usually restricted to the conservatory and window, where it forms one of the most attractive objects throughout the Winter.

4. *P. Auricula* (fig. 202). Common Auricula.—Probably no other Alpine plant has received so much attention from British gardeners as the present, having been in cultivation for nearly three centuries, and many of the best varieties having been raised in this country. It differs from its nearest allies in having oblong-lanceolate or obovate more or less minutely glandular-toothed fleshy and glaucous mealy leaves. The flowers are normally yellow and somewhat velvety, but from the effects of culture they have assumed all the shades of yellow, maroon, and purple, the latter sometimes almost black, and in some there are tints of greyish green or blue, due in part to the presence of a glaucous meal like that on the foliage. The most esteemed varieties combine two or three different tints arranged in concentric circles. They are divided into several groups, according to the disposition of the colours. The English classification includes five variations, namely: 1. Green-edged. 2. White-edged. 3. Grey-edged. 4. Selfs; and 5. Alpines.



Fig. 202. Primula Auricula. (¼ nat. size.)

Nos. 1, 2, and 3 are sufficiently explanatory. Selfs are those double or single-flowered varieties with a uniformly yellow, purple-brown, purple, or violet limb and a white eye. Alpines are distinguished by having the margin of two blended colours, or at least by their not being separated into distinct bands, and by the yellow centre.

5. *P. Japónica.* Japanese Primrose.—This is a very handsome hardy species of quite recent introduction. It is glabrous in all its parts, having large oblong-spathulate coarsely irregularly and sharply-toothed sessile leaves, and tall scapes from 1 to 2 feet high bearing about 5 or 6 whorls of showy variously-coloured flowers about an inch in diameter. There are crimson, maroon, lilac, rosy-pink, and white varieties with a differently coloured eye already in cultivation. If easily grown there is no doubt that this species will rapidly spread, as it is one of the most beautiful of dwarf hardy perennials. It is a native of the island of Yeso.

6. *P. farinòsa.* Bird's-eye Primrose.—This is a mountain plant of wide distribution, occurring in the North of England and in Scotland. It grows from 4 to 6 inches high, with small obovate-spathulate leaves clothed with a white or yellow mealy indumentum on the under surface. Scape exceeding the leaves, and bearing an umbel of small lilac-red flowers with a yellow eye.

P. Scótica, found in the extreme North of Scotland, differs in its broader petals.

We might include several more species if we had the space at our disposal, but we must be content with quoting the names of a few of the best. They are for the greater part mountain plants, requiring special care and treatment.

P. cortusoìdes, rosy flowers, Siberia; *P. mínima*, rose and white, Alps; *P. Munròi*, tall, white, North India; *P. villòsa*, purple, Alps; and *P. amæ̀na*, bright rosy-purple umbellate flowers, from the Caucasus. The last is a particularly handsome plant.

2. ANDROSÀCE.

A genus of diminutive annual or perennial scapose tufted herbs, natives of mountainous regions. They agree in most characters with *Prímula*, differing in the tube of the corolla being constricted towards the top. There are almost a dozen species in the Swiss Alps, and a few others scattered over the North of Asia and America. Name from *ἀνήρ*, a male, and *σάκος*, a buckler, referring to the shape of the anther.

A. ciliàta, with solitary purple flowers; *A. láctea*, white umbellate flowers; *A. lanuginòsa*, pink and yellow umbellate flowers; and *A. villòsa*, pure white, with a yellow or pink eye, are some of the most desirable of the perennial species.

Arètia Vitaliàna is a tufted Alpine plant about 2 inches high with linear leaves and bright yellow flowers having the corolla-tube inflated at the middle, and the ovary 5-ovulate.

Cortùsa Matthìoli is a scapose perennial about 6 inches high. Leaves petiolate, rotundate, irregularly toothed or lobed. Flowers purple, umbellate, drooping. Corolla funnel-shaped or campanulate, with a short tube and sub-erect limb. Capsule 2-valved. Swiss Alps.

3. CŸCLAMEN.

A very distinct genus, remarkable for the large circular compressed perennial rootstock, from which the leaves and flowers spring. Calyx 5-partite. Corolla-tube short; limb large, deeply lobed; lobes turned back, giving the flowers the appearance of a shuttlecock. Capsule 5-valved. There are about eight species, in Europe, North Africa, and Asia. The name is from *κύκλος*, a circle, in allusion to the spiral peduncle. Sowbread is the popular name for the species of this genus.

1. *C. Pérsicum* (fig. 203).—This species is the one generally seen in conservatories, but it is not so hardy as the following



Fig. 203. Cyclamen Persicum. (¼ nat. size.)

species, and is merely introduced here for the woodcut. There are many handsome varieties.

2. *C. Europæum.*—Leaves produced with the flowers, repand or crenulate, ovate-rotundate, deeply cordate at the base, with

an acute sinus. Segments of the corolla acute, throat naked. Flowers white and pink, or some shade of red or purple, appearing in Autumn. South of Europe.

3. *C. hederæfòlium.*—The hardiest of all the species, and a very handsome plant. It is found naturalised in some parts of England. Leaves appearing after the flowers, cordate-ovate, angular, crenulate. Segments of the corolla acute, throat furnished with 10 teeth. Flowers autumnal, white or pink, red at the throat. The foliage in both species is often mottled or marked with white, and purple beneath; and the tuber in this species especially attains a very large size.

4. *C. Còum.*—A smaller species with rounded slightly toothed or entire leaves cordate at the base, with overlapping lobes. Flowers appearing in early Spring. Segments of the corolla oval, bright red with a darker spot at the base, and a white throat. South of Europe. *C. vérum* is a closely allied species, or, perhaps, merely a variety having paler coloured flowers and variegated foliage.

C. Ibèricum and *C. Neapolitànum* are tender Spring-flowering species.

4. DODECÁTHEON.



Fig. 204. Dodecatheon Meadia. (½ nat. size.)

Fibrous-rooted glabrous perennials with oblong-spathulate leaves and naked umbellate scapes of flowers. Calyx deeply 5-cleft, lobes reflexed. Corolla-lobes long, narrow, reflexed. Stamens with short filaments and large conspicuous exserted anthers, forming a slender cone. Capsule 5-valved. This genus appears to be limited to North America, and consists of three or four species only. Name from δώδεκα, twelve, and θεοί, gods, of fanciful application.

1. *D. Meàdia* (fig. 204). American Cowslip. Shooting Star.—A very handsome plant with wavy toothed leaves and rosy purple, white or lilac corollas, and yellow anthers, flowering in Spring.

D. integrifòlium is a much dwarfer species, having entire leaves and rather larger showy lilac-purple or crimson flowers; and *D. Jeffreyànum*, of recent introduction, is distinguished by its greater stature, fleshy midribs of its very large leaves, and by the tetramerous not pentamerous flowers.

Soldanélla alpìna is an elegant diminutive mountain plant about 2 or 3 inches high with small petiolate rotundate cordate crenate glandular leaves, and 2- or 3-flowered bracteolate scapes. Corolla blue or lilac, campanulate, limb finely fringed, capsule splitting transversely. *S. montàna* is a somewhat larger hairy plant; and *S. mínima* and *S. pusílla* have one-flowered scapes, and more regular less deeply fringed corollas.

5. LYSIMÀCHIA.

Erect or creeping herbs with leafy stems and yellow or white, rarely purple flowers. Leaves simple, alternate, opposite or whorled. Flowers solitary, racemose or paniculate, axillary or terminal. Corolla rotate; lobes spreading or erect. Stamens 5 or 6, included or exserted. Capsule 5 or 10-valved. There are about forty species, spread over the north temperate zone, less frequent in the southern hemisphere, and at great elevations in the tropics. The name is from λύσις, a release from, and μάχη, strife.

1. *L. vulgàris.* Yellow Loosestrife.—This is an indigenous species of erect habit, about 3 feet high, usually found in damp places and on river-banks. Leaves opposite or whorled, ovate or lanceolate, acute, furnished with black glandular dots. Flowers deep yellow, in terminal panicled cymes, appearing in Summer.

2. *L. Nummulària.* Creeping Jenny, Moneywort.—A prostrate creeping species with opposite rotundate cordate obtuse glabrous leaves and large solitary axillary yellow flowers having broad sepals, ciliate petals, and glandular connate filaments. This is a handsome plant, abundant in some parts of England, and often transferred to the garden. *L. némorum*, the Yellow Pimpernel, is another native trailing species with ovate acute leaves, narrow acute sepals, and free glandless filaments.

3. *L. thyrsiflòra*, syn. *Naumbérgia thyrsiflòra.*—An erect species from 1 to 3 feet high with sessile lanceolate leaves and dense axillary racemes of yellow flowers, produced in Summer. This plant has been separated from the other species on account of the presence of small scales in the throat of the corolla and

the exserted stamens. It is a widely dispersed plant, occurring sparingly in various parts of Great Britain.

4. *L. Ephémerum.*—An erect species with linear-lanceolate glaucous leaves and terminal erect racemes of rather small white flowers with a dark eye and exserted stamens. It is a native of the South of Europe, and, like the others, Summer-flowering.

5. *L. latifòlia.*—This is an erect species with solitary axillary yellow flowers on slender drooping peduncles. Leaves glabrous, linear or oblong-lanceolate. Petals slightly toothed. There are two forms: *L. hỳbrida* with broader foliage, and *L. angustifòlia* of more branching habit and narrow leaves. A native of North America.

Trientàlis Europæa is a rare mountain plant in the North of England and in Scotland. It grows about 4 to 6 inches high, with one whorl of 5 or 6 shining obovate-lanceolate leaves, from which spring a few white flowers about 8 lines in diameter, on slender erect naked peduncles.

Còris Monspeliénsis, the only species of its genus, is a dwarf branching plant having alternate linear coriaceous leaves and dense terminal spikes of lilac-blue flowers with yellow anthers. The calyx is double, and the corolla bilabiate.

6. ANAGÁLLIS.

A small genus of trailing annual or perennial herbs with usually angular stems, opposite or verticillate leaves, and solitary brightly coloured pedunculate flowers. Calyx deeply 5-lobed. Corolla rotate or funnel-shaped. Stamens 5, inserted at the base of the corolla; filaments bearded. Capsule globose, dehiscing transversely, many-seeded. The species are found in Europe, Asia, North Africa and South America; we have two indigenous species. *A. arvénsis*, Poor Man's Weather-glass, is a trailing glabrous glandular-dotted annual with bright scarlet flowers which only expand in bright weather; varieties with pink or white or blue flowers are occasionally found. *A. tenélla*, Bog Pimpernel, is a very small slender perennial species with ovate or orbicular leaves and rosy flowers with darker veins. The generic name is the same as applied by the ancients to one of the common species.

1. *A. Índica.*—This is the common annual species grown in gardens with deep blue flowers. The flowers are larger than

those of the wild species, which it very closely resembles in other particulars.

2. *A. Monélli.*—A perennial species with deep blue flowers, about 6 lines in diameter in the common variety. But there are varieties with larger scarlet, maroon or lilac flowers, supposed to be the result of hybridized seed between this and *A. fruticòsa*, a handsome species with large vermilion flowers, from North Africa. *Bréweri*, *Phillipsi*, *Párksii*, and *Phœnícea* are some of these varieties. They are usually treated as annuals.

Hottònia palústris, Featherfoil or Water Violet, is the only other plant of this order we have to mention. It is a native, but by no means common, growing in ponds and sluggish brooks. Leaves submerged, whorled, deeply divided into numerous thread-like segments. Flowers white, pink or lilac, whorled in terminal racemes.

Order LXXXVII.—GLOBULÀRIEÆ.

Herbs or small shrubs with tufted radical and alternate entire exstipulate glabrous cauline leaves, and involucrate capitules of flowers. Calyx persistent, 5-lobed, lobes quincuncial in bud. Corolla 5-lobed; lobes narrow, usually unequal. Stamens 4, inserted in the tube of the corolla, and alternate with its lobes, the fifth between the two upper lobes being deficient. Fruit a dry 1-celled 1-seeded indehiscent achene. This order is limited to one genus of few species, inhabiting the Mediterranean region.

1. GLOBULÀRIA.

Characters the same as those of the order. The name is from the Latin *globulus*, a little ball, in allusion to the arrangement of the flowers. None of the erect woody species are quite hardy in this country.

1. *G. vulgàris.*—A tufted perennial about 6 inches high with spathulate emarginate or shortly tridentate radical leaves and numerous stems clothed with small lanceolate leaves, and terminated by a solitary head of deep blue flowers. A native of the mountains of Europe, flowering in Summer.

2. *G. cordifòlia.*—This is a trailing shrubby species with petiolate obovate-cuneate obtuse emarginate or tridentate

leaves and solitary flower-heads terminating the branches. Flowers blue, appearing in early Summer.

G. nudicaùlis is another common European species with obtuse radical leaves, leafless flower-scapes, and blue flowers.

Order LXXXVIII.—PLUMBAGINÀCEÆ.

Herbs or undershrubs, for the greater part denizens of salt marshes and the sea-shores. Leaves simple, alternate or clustered, exstipulate. Flowers regular, bisexual, in branched panicles, or clustered in involucrate heads. Calyx tubular, plaited, persistent, sometimes scarious and coloured. Corolla monopetalous, with a narrow tube, or composed of 5 separate clawed petals. Stamens 5, epipetalous, or hypogynous in the monopetalous genera. Styles usually 5, rarely 3 or 4. Fruit a 1-celled 1-seeded indehiscent or irregularly dehiscent utricle. Seed pendulous. There are 10 genera, and upwards of 200 widely scattered species.

1. ARMÈRIA.

Perennial tufted evergreen herbs with linear radical leaves and leafless flower-scapes. Flowers pedicellate, collected in dense solitary heads. Involucre scarious, sheathing the scape, and reversed or turned downwards. Petals cohering at the base persistent. There are about thirty species, inhabiting the sea-coasts and the mountains of the temperate regions of the north, a few reaching the Arctic regions and South America. *Flos Armeriæ* is the Latin name for the flowers of a species of Pink.

1. *A. vulgàris*, syn. *A. marítima*, *Státice Armèria*, etc. Common Thrift, Sea-Pink, or Lady's Cushion.—Leaves linear, usually 1-nerved, and more or less pubescent. Flower-scapes in cultivation from 6 to 12 inches high. Flowers pink, rosy red, lilac or white. This species is common on the sea-coast and the summits of lofty mountains in this country, and has besides a very wide range of distribution. *A. alpìna* is a dwarfer mountain form of this species.

2. *A. plantagínea.*—A glabrous stouter-growing species with broader 3- to 5-nerved leaves and taller scapes. Flowers bright rose, not so profuse as in the last. *A. leucántha* is a white-flowered variety of this species. Found in Jersey, and southward in Europe.

3. *A. cephalòtes.*—A taller species when fully developed than either of the foregoing, the scapes rising to a height of 12 to 18 inches or more. Leaves broadly-lanceolate, glabrous, acute. Flowers deep rose or crimson. Native of the Mediterranean region.

2. STÁTICE.

In floral characters this genus is very near the last, but the disposition of the flowers is very different, being in spicate secund or distichous bracteate panicles. Leaves all or nearly all radical and rosulate, spathulate or oblong, not linear. There are about fifty species, chiefly abundant in the saline districts of Western Asia. The name is derived from στατίζω, to stop, in reference to the astringent properties of some of the species.

1. *S. Limònium.* Sea Lavender.—This is the commonest and the largest of the indigenous species. It is technically distinguished from the others by the calyx-lobes being furnished with intermediate teeth. Flowers lilac-blue or white. *S. Bahusiénsis*, syn. *S. rariflòra*, is a variety with lax spikelets. Native of the coast of England and extreme South-west of Scotland, flowering from July onwards till late in Autumn.

2. *S. elàta* (fig. 205), syn. *Goniolìmon elàtum.*—This is a



Fig. 205. Statice elata. ($\frac{1}{10}$ nat. size.)

handsome species from Siberia, with bright green glabrous foliage, and blue flowers, produced from July to September.

S. Gmelìni is a similar species from the same region as the last. *S. latifòlia* is a large-growing species from Southern Russia, with ample oblong obtuse foliage and spreading panicles of light blue flowers; *S. exímia*, from Soongaria, has pink or rosy flowers; *S. incàna*, from Egypt, crimson and white; and *S. Fortùnei*, a tender Chinese species, has yellow flowers.

3. ACANTHOLĬMON.

A considerable genus of branching herbs with narrow linear rigid often spinescent leaves and larger flowers in loose spikes. The styles are united at the base, and the stigmas capitate, differing in this respect from *Státice*, with which it was formerly combined. The species are nearly all from Western Asia. The name is from *ἄκανθα*, a thorn, and *Limònium*, the specific name of the common *Státice*.

1. *A. glumàceum*, syn. *Státice Araráti*.—A dwarf densely branched evergreen herb with spinescent foliage and rosy spicate flowers about 6 lines in diameter, and 6 to 8 in each spikelet. A native of Armenia, flowering in Summer.

A. venústum is a Persian species, larger than the preceding, with from 12 to 20 flowers in each spikelet.

4. VALÓRÀDIA.

A small genus of branching herbs and undershrubs with alternate fringed leaves and terminal and axillary dense heads of flowers. Calyx tubular, 5-parted. Corolla funnel-shaped. Stamens 5, hypogynous; styles united. The species are from Abyssinia and China. Name commemorative.

1. *V. plumbaginoìdes*, syn. *Plumbàgo Larpéntæ*.—A showy perennial from 1 to 2 feet high with obovate mucronate ciliate scaly leaves and bright blue ultimately violet flowers, appearing in Autumn. A native of Northern China.

Plumbàgo Capénsis is a half-hardy procumbent or climbing shrub with scaly leaves and spicate panicles of handsome azure blue flowers, sometimes employed for bedding, etc.

Division III.—*APETALÆ.*

Petals none (in those plants enumerated here); calyx (perianth) sometimes coloured, composed of free or united sepals (segments) in one series, or sometimes wanting altogether.

Order LXXXIX.—POLYGONÀCEÆ.

Herbs (or rarely shrubs) with alternate simple leaves and sheathing often fringed stipules. Flowers usually hermaphrodite, on jointed pedicels. Perianth inferior, composed of 3 to 6 petaloid or green, free or united, persistent segments, imbricate in bud. Stamens 3 to 12, or more. Fruit a dry 1-celled 1-seeded indehiscent achene or nut, usually enveloped in the perianth. Seeds erect, albuminous. This order comprises about 30 genera and 500 species, found in all regions, but most abundantly in the north temperate zone. The Docks and Knotweeds represent them only too well in this country.

1. POLŸGONUM.

Herbs or undershrubs with alternate stipulate leaves and racemose, paniculate or spicate bisexual flowers. Bracts ochreate. Perianth usually coloured, of 5 nearly equal segments, the three outer sometimes enlarging over the flattened or trigonous fruit. Stamens 5 to 8; anthers versatile. The species are estimated at 150, and are dispersed all over the world. There are twelve indigenous species, mostly weeds. The generic name is composed of πολύ, many, and γόνυ, knee, from the numerous joints of the stems.

1. *P. cuspidàtum*, syn. *P. Sieböldii*.—This is a tall handsome perennial, belonging to the foliage section of ornamental plants. It grows from 4 to 8 feet high, and bears an abundance of large somewhat distichous oval-oblong cuspidate petiolate leaves. Flowers white, in drooping racemes, succeeded by scarlet fruits. A native of Japan, flowering in Summer.

2. *P. Brunònis*.—A dwarf perennial species, rarely exceeding a foot in height. Leaves petiolate, oblong-lanceolate, acute, with a cartilaginous margin. Flowers rosy red, in dense terminal spikes appearing in Summer. Northern India.

3. *P. Bistórta*. Bistort or Snake-root.—This is a rare indigenous species, and the handsomest we have. Leaves chiefly radical, large, oblong or ovate-obtuse, glaucous beneath, on long petioles. Flower-scapes erect, furnished with a few sessile leaves, and terminated by a solitary erect dense spike of reddish pink flowers, produced from June to September.

P. amphíbium is a perennial aquatic or semi-aquatic native species. When growing in water the petioles are very long and the stipules smooth, whilst the terrestrial form has short petioles and hispid stipules. The flowers are bright red.

4. *P. vaccinifòlium.*—This is a desirable creeping branched sub-shrubby species. Leaves small, oblong-ovate, acute, with slightly revolute margins. Flowers bright rosy red, in numerous terminal spikes towards the end of Summer. Native of Northern India.

5. *P. orientàle.*—A tall annual species from 3 to 4 feet high. Leaves large, ovate-acuminate, pilose or nearly glabrous. Flowers deep rosy purple or white, in long drooping racemes. Northern India and China.

2. RHÈUM.

Perennials with usually very large radical leaves on long



Fig. 206. Rheum undulatum. (About $\frac{1}{20}$ nat. size.)

petioles, and an erect branched somewhat leafy inflorescence,

in some species furnished with large sheathing bracts. Flowers small, white, yellowish, or pink. Perianth composed of six petaloid subequal segments. Stamens 9. Fruit triangular, winged. Natives of various parts of Asia, especially the western district. The name is said to be derived from *Rha*, the Russian name of the river Wolga, on the banks of which a species of Rhubarb abounds. The species cultivated for their fleshy petioles are *R. Rhapónticum* and *R. undulàtum* (fig. 206).

1. *R. Emòdi.*—A handsome species with large slightly rugose leaves having prominent red nerves. Flowers yellowish white, appearing in Summer. Tartary.

2. *R. palmàtum.*—This species is readily distinguished by its deeply divided rough foliage. Also from Tartary.

3. *R. Rìbes.*—This has large rounded cordate or reniform scabrous leaves and bright scarlet fruits. A native of Western Asia.

R. nóbile is a magnificent plant from the mountains of Sikkim, probably not in cultivation at the present time. It is a tall-growing species having large leafy coloured bracts on the flower-spikes.

The genus *Rumex*, Dock, is distinguished by its perianth of 6 segments, the three inner segments usually enlarging, 6 stamens, and trigonous fruit. *R. Hydrolápathum*, with oblong-lanceolate leaves on long petioles, is a distinct indigenous species inhabiting ditches and ponds.

Order XC.—NYCTAGINÀCEÆ.

Annual or perennial herbs, rarely shrubs, usually swollen at the joints. Leaves opposite or alternate, and frequently unequal. Flowers bisexual, capitate or solitary. Perianth inferior, coloured, tubular or funnel-shaped, constricted in the middle. Stamens definite, hypogynous. Fruit a 1-celled 1-seeded utricle enclosed in the enlarged often indurated tube of the perianth. Seeds adhering to the walls of the ovary. There are about 16 genera and 100 species, chiefly tropical.

1. ABRÒNIA.

Herbs with opposite simple petiolate leaves and capitate flowers surrounded with a finely divided involucre. Perianth funnel-shaped or salver-shaped. Stamens 5. A small genus of North-western American plants. The name is said to be from *ἁβρός*, elegant, in allusion to the involucre.

1. *A. umbellàta.*—A trailing annual plant with oblong or oval entire leaves on long petioles, and small pedunculate heads of sessile rosy-pink flowers. A native of California.

2. *A. arenària.*—An herbaceous perennial with cordate or orbicular entire viscous leaves and capitate yellowish brown flowers. Also from California.

2. MIRÁBILIS.

Showy tuberous-rooted perennials with jointed stems, opposite simple leaves and showy flowers clustered towards the extremities of the branches. Perianth tubular or funnel-shaped. Stamens 5, cohering at the base in a ring, equalling or exceeding the perianth. About half a dozen species are known, natives of Central America and the West Indies. The name *mirábilis*, wonderful, was probably given to this genus because the Jalap of commerce was believed to be the product of *M. Jalàpa*.



Fig. 207. Mirabilis Jalapa. (½ nat. size.)

1. *M. Jalàpa* (fig. 207). Marvel of Peru.—This familiar plant is treated as an annual. There are numerous varieties with white, yellow, crimson, or scarlet flowers, and others

striped or blotched with two or more of these colours. West Indies.

M. longiflòra, a Mexican species, is remarkable for its long tubular fragrant viscid flowers, which vary in colour from white and pink to violet. There are hybrid varieties between this and the preceding. *M. dichótoma* is called Four-o'clock Flower in the West Indies, from the time at which its flowers commonly expand.

Order XCI.—PHYTOLACCÀCEÆ.

Herbs or shrubs. Leaves alternate, entire, exstipulate, commonly furnished with transparent dots. Flowers racemose, bisexual. Perianth inferior, sometimes coloured, frequently furnished with bracts at its base, giving it the appearance of a corolla; segments 4 or 5, free or slightly united. Stamens indefinite, or if of the same number as the perianth-segments alternate with them. Fruit baccate or dry, composed of a solitary carpel or several distinct or more or less united, each carpel 1-seeded. A small order comprising about eighty species divided into twenty genera, mostly natives of the warmer parts of America.

1. PHYTOLÁCCA.

Tall branching rapid-growing robust perennials, shrubs or small trees. Perianth of 5 or 6 petaloid or green segments. Stamens 5 to 30. Fruit fleshy and juicy, composed of 5 to 12 united carpels. There are about ten species, one or two of which are widely dispersed in the tropics. The generic name is a compound of the Greek word *φυτόν*, a plant, and the French word *lac*, lake, in reference to the crimson juice of the fruit.

1. *Ph. decándra.* Poke-weed, Pigeon-berry, Red-ink Plant.—This is a tall glabrous plant from 5 to 10 feet high with large ovate petiolate leaves and long extra-axillary racemes of white flowers followed by succulent purple berries. Native of North America, and now naturalised in the South of Europe, and many other countries.

2. *Ph. icosándra.*—A dwarfer species having the stems tinged with red, the flowers smaller, in very slender racemes, and usually more than ten stamens. A native of various parts of South America, and rather tender in our climate.

Ercílla spicàta, syn. *Bridgèsia spicàta*, is a Chilian evergreen climbing shrub, in the way of Ivy.

Order XCII.—CHENOPODIÀCEÆ.

A considerable order of herbaceous or shrubby plants of little beauty. It is represented in Britain by about six genera and twenty species. The principal distinctive floral characters are—an inconspicuous 5-parted perianth, 5 stamens opposite the flat perianth-segments, and a membranous or baccate 1-seeded fruit. *Chenopòdium álbum*, Goose-foot or Fat-Hen, is one of the commonest of annual weeds. The ornamental species are few, not more than one or two being cultivated for the beauty of their flowers. There is a variety of the garden Orach, *Átriplex hortènsis rùbra*, with crimson foliage; and the Chilian Beet, *Bèta Chilénsis*, furnishes two handsome foliage-plants, one bright yellow and the other crimson.

Átriplex Halìmus is a hardy dwarf evergreen shrub with simple alternate small ovate-oblong entire petiolate leaves densely clothed with a grey scaly indumentum. It is a sea-coast plant from the Mediterranean region.

Chenopòdium scopàrium, syn. *Kòchia scopària*, Belvedere Cypress, is a tall slender erect-growing annual 4 to 6 feet high with linear lanceolate entire leaves and small greenish flowers. *Chenopòdium purpuráscens*, syn. *C. Atríplicis*, is a handsome annual from China, with lanceolate petiolate entire or lobed leaves and clustered heads of bright reddish purple flowers. The stems and foliage are frequently coloured.

Blìtum virgàtum, Strawberry Blite, is a weedy-looking annual from Southern Europe and Asia, with triangular hastate irregularly-toothed leaves on long petioles, and inconspicuous spicate flowers followed by fleshy scarlet fruits.

Order XCIII.—AMARANTHÀCEÆ.

Herbs or shrubs with opposite or alternate exstipulate leaves and a spicate or capitate inflorescence often clothed with bright coloured scarious bracts. Perianth inferior, composed of 3 or 5 scarious coloured or herbaceous segments, which are quite free or slightly united. Stamens 3 or 5, and opposite the perianth-segments, or some multiple of that number. Fruit membranous or baccate, 1-celled, 1- or more seeded; seeds

albuminous, with a hard usually shining testa. There are between 40 and 50 genera, and nearly 500 species belonging to this order. They are chiefly tropical, and we have no native representatives.

1. AMARÁNTHUS.

Coarse-growing annuals with alternate entire leaves and small green or red flowers in large bracteate clustered spikes



Fig. 208. Amaranthus caudatus. (¼ nat. size.)

Flowers polygamous, furnished with 3 bracts at the base of a 3- or 5-lobed glabrous perianth. Stamens free, 5 or 3. Fruit a

1-seeded utricle, dehiscing transversely. There are about twelve species, widely spread in warm and tropical countries. The name is compounded of *ἀ* privative, *μαραίνω*, to fade, and *ἄνθος*, a flower, in reference to the persistent scarious



Fig. 209. Amaranthus hypochondriacus. (¼ nat. size.)

flowers and bracts. *A. crístatus*, syn. *Celòsia cristàta*, is the Cockscomb of our conservatories.

1. *A. caudàtus* (fig. 208). Love-lies-bleeding.—This showy annual is one of the common inhabitants of cottage-gardens. The pendulous half-trailing inflorescence is either crimson or pale yellow. It is a native of the East Indies, and was introduced in 1596.

2. *A. hypochondrìacus* (fig. 209). Prince's Feather.—This is distinguished by its erect habit and deep crimson inflorescence. The foliage too is purplish beneath. Also Asiatic. *A. speciòsus*, a variety of the same or a closely allied species, bears the same name.

A. trìcolor (fig. 210), a variety of *A. melanchólicus*, with ornamental foliage, is a favourite bedding plant. The variega-



Fig. 210. Amaranthus tricolor. (¼ nat. size.)

tion consists of an admixture of crimson, yellow, and green. *A. salicifòlius* is a handsome plant of recent introduction from the Philippine Islands, having very long narrow pendulous wavy leaves variegated with bright red.

2. IRESÌNE.

Herbs with opposite petiolate glabrous leaves, brightly coloured in the cultivated forms. Flowers tribracteate, polygamous or diœcious. Perianth 5-parted. Stamens 5. Fruit a 1-seeded indehiscent utricle. A small genus whose species are nearly all from tropical America. The name is from *εἰρεσιώνη*, in allusion to the woolly branches and inflorescence of some of the species.

1. *I. Hérbstii.*—This plant has very handsome foliage variegated with purplish red and dark violet, or in a variety called *aùreo-reticulàta* with yellow. A native of Brazil.



Fig. 211. Gomphrena globosa. (¼ nat. size.)

I. Lindèni is another plant with ornamental foliage referred to this genus, but in the absence of flowers there is some doubt of its affinities.

Gomphrèna globòsa (fig. 211), Globe Amaranth, a pretty annual, is sometimes planted out in sheltered situations. There are crimson, purple, and white varieties. The flowers and bracts being dry and scarious, they will keep their colour throughout the winter if cut at the right time, and are therefore desirable for mixing with other everlasting flowers. Native of the East Indies.

The genus *Alternánthera* furnishes several dwarf tufted plants with small coloured leaves: *A. spathulàta*, *A. séssilis* var. *amœ̀na*, etc., are already widely diffused in gardens.

Order XCIV.—LAURÀCEÆ.

A large order of ornamental shrubs and trees, often aromatic. Leaves alternate, rarely opposite, usually entire, exstipulate, frequently furnished with immersed pellucid dots. Flowers generally small and inconspicuous, unisexual or bisexual, arranged in sessile clusters or umbellate or paniculate. Perianth inferior, 4- to 6-lobed. Stamens definite; anthers opening by

2 or 4 longitudinal valves. Fruit a 1-celled 1-seeded berry or drupe; seed pendulous. There are about 50 genera and 450 species, common in sub-tropical regions of Asia and America. Few hardy species are known.

1. LAÛRUS.

Shrubs or trees with 1-nerved alternate leaves and fascicled sessile sub-diœcious flowers. Perianth 4- to 6-lobed. Stamens 12, all fertile; anthers opening upwards by 2 valves. Fruit a succulent berry surrounded by the persistent base of the perianth. Only two species are retained under this genus by some authors. The Latin name of the European species.

1. *L. nóbilis.* Sweet Bay, Laurel of the Ancients.—This aromatic fragrant evergreen shrub has oblong-lanceolate acute venose leaves and axillary clusters of yellowish flowers in early Spring. It is a native of the extreme South of Europe. There is a closely allied half-hardy species from the Canaries.

L. Sássafras, syn. *Sássafras officinàle*, is a hardy deciduous tree of small stature from North America. It has deeply furrowed rough aromatic bark, yellowish green twigs, ovate entire or trilobate leaves, greenish yellow diœcious flowers in clustered racemose panicles, appearing with the leaves. The anthers are 4-valved, and this with other characters has been considered sufficient to separate it from *Laùrus.*

L. Benzòin, syn. *Benzòin odoríferum*, is a deciduous North American shrub with oblong-ovate leaves and clustered umbellate flowers appearing before the leaves. It is rarely seen in gardens.

Order XCV.—THYMELÀCEÆ.

Shrubs or trees with a tough fibrous bark, or rarely herbaceous. Leaves simple, entire, opposite or alternate. Flowers usually bisexual, in terminal or axillary spikes or heads, sometimes involucrate, rarely solitary. Perianth inferior, tubular-campanulate; limb usually 4-lobed, lobes imbricate in bud. Stamens commonly 8, and in two series, sometimes 4 or 2, and opposite the perianth-lobes. Fruit a berry or drupe or dry nut, 1-celled 1-seeded; seed pendulous. Genera about 40, including 300 species. Rare in the northern hemisphere, abundant at the Cape of Good Hope, in Australia and South America.

1. DÁPHNE.

Small erect or trailing shrubs with alternate or opposite persistent or deciduous leaves and very fragrant lateral or terminal flowers. Perianth tubular, 4-lobed. Stamens 8, in 2 series; style short or none. Fruit coriaceous or fleshy. North temperate regions of the Old World. Name of classical origin.

Deciduous species, flowers lateral, appearing before the leaves.

1. *D. Mezèreum.* Mezereon.—A small erect branched shrub which produces its clusters of pink, rose or purplish, rarely white flowers in Winter. Leaves membranous, 2 to 3 inches long, lanceolate, obtuse or acute, shortly petiolate. Occasionally seen in copses in the South of England, but perhaps not indigenous.

2. *D. Fortùnei.*—This has lilac flowers, also appearing early in Winter. China.

Erect evergreen species with greenish-yellow axillary flowers.

3. *D. Laurèola.* Wood Laurel.—A shrub 2 to 3 feet high. Leaves coriaceous, 4 or 5 inches long, lanceolate, almost sessile. Flowers in clusters in the axils of the upper leaves, appearing in February. Native in England.

4. *D. Póntica.*—Very similar to the last, but differing in the lighter green foliage, and deeper coloured flowers which appear about a month later. It is a native of Asia Minor, and not quite so hardy. Both of these, and also No. 1, are employed for grafting the greenhouse and rarer varieties upon.

Evergreen or deciduous trailing or erect species with terminal flowers.

5. *D. alpìna.*—An undershrub with lanceolate obovate pubescent deciduous leaves and terminal sessile villose white or rose flowers. A pretty species, suitable for rockwork. Italian Alps. *D. Dauphin* of gardens is an improved variety of this; and *D. Verlòti*, a charming little shrub with rosy carmine flowers, inhabiting the same localities, appears to be a diminutive form of the same.

6. *D. collìna.*—An erect shrub 2 or 3 feet high. Leaves oblong-obovate, obtuse, shining, glabrous above, hirsute beneath, persistent. Flowers in clusters, villose, rose-coloured. South of Europe.

7. *D. Cneòrum.*—A trailing much-branched shrub with linear obtuse mucronate glabrous persistent leaves and bright rose flowers. This is the handsomest of the hardy species, and produces its exquisitely fragrant flowers in great profusion in early Spring. It is a very free grower and deserves a place in the smallest garden.

Order XCVI.—PROTEÀCEÆ.

A large order of shrubs and trees of extremely diverse and curious habit and foliage. Flowers often very brilliant, axillary or racemose, or in dense terminal spikes. Perianth inferior, 4-lobed or -toothed; lobes valvate in bud. Stamens 4, opposite the perianth-lobes. Fruit usually dry and woody, dehiscent or indehiscent, 1-celled, 1- or more seeded. Nearly all the members of this order occur in Australia and South Africa, a few only extending to South America, and northward in the Old World to Abyssinia, India, and Japan. None of the species are quite hardy with us, though some may withstand the ordinary winters of the south-western counties of England. *Embòthrium coccíneum*, a native of South America, is one of the hardiest. It is a shrub with simple entire oblong leaves and long pendent orange-scarlet flowers. The perianth is tubular with a sub-globose 4-cleft limb bearing the sessile anthers on the concave lobes. *Grevíllea robústa*, *Stenocárpus Cunninghàmii*, *Persóonia Tòru*, *Knightia excélsa*, *Hákea* spp. and *Rhòpala* spp., etc., are handsome shrubs for Summer decoration

Order XCVII.—ELÆAGNÀCEÆ.

Trees or shrubs often clothed with a scaly indumentum. Leaves alternate or opposite, entire, exstipulate. Flowers usually small, regular, unisexual or bisexual, disposed in axillary clusters, panicles or catkins. Male flowers amentaceous, solitary in the axil of a bract, with a 2- or 4-lobed perianth. Female and hermaphrodite flowers with a free tubular perianth. Stamens 3, 4 or 8, sessile. Fruit superior, 1-celled, 1-seeded, enclosed in the perianth-tube; seed erect. A small order consisting of four genera and about thirty species, for the greater part natives of the northern hemisphere.

1. ELÆÁGNUS.

Deciduous or evergreen shrubs or small trees with hermaphrodite clustered or solitary axillary flowers. Perianth campanulate or salver-shaped. Stamens 4 or 5. Fruit a spurious drupe formed of the fleshy perianth-tube and the 1-seeded nut. A small genus scattered over the northern hemisphere. The classical name of the Wild Olive, hence the English name Oleaster.

1. *E. angustifòlia*, syn. *E. horténsis.*—A very handsome and distinct small hardy tree with a few scattered spines, lanceolate oblong or ovate acute quite entire leaves covered on both sides as well as the branches with silvery glistening scales and fragrant flowers yellow within, scaly without, solitary or 3 or 4 together, produced in great profusion in Summer, and followed by red berries. A native of the South of Europe and Western Asia.

2. *E. argéntea.* Silver Berry.—A spreading shrub 8 to 12 feet high, young branches ferruginous. Leaves varying from lanceolate to broadly elliptical, clothed with silvery scales on both sides. Flowers axillary, clustered. Berries silvery, ribbed. A native of North America.

E. umbellàta, syn. *E. Japónica*, and *E. refléxa.*—The beautiful Japanese variegated varieties in cultivation appear to belong to this species, but in the absence of flowers and fruits it is impossible to identify them with the described species. *E. púngens* is a spiny shrub of which there are variegated forms; and *E. lóngipes*, syn. *E. crispa*, *E. multiflòra*, etc., is another variable Japanese species.

Hippòphaë rhamnoìdes, Sea Buckthorn, is a deciduous shrub with narrow glabrous silvery foliage and dicœcious flowers. Male flowers in axillary clusters, perianth bipartite. Stamens 4. Female flowers solitary; perianth slightly 2-lobed. Fruit membranous, included in the fleshy orange-yellow perianth-tube. A native of the eastern coast of England and various parts of Europe and Asia.

2. SHEPHÉRDIA.

A small genus of North American deciduous dicœcious shrubs. Male flowers clustered, with a quadripartite perianth valvate in bud, and 8 stamens alternating with an equal number of appendages of the fleshy disk. Female flowers solitary, with

an urceolate 4-lobed perianth, the mouth closed with the teeth of the disk. Fruit enclosed in the fleshy perianth. Named in honour of J. Shepherd, formerly curator of the Liverpool Botanic Garden.

1. *S. Canadénsis.*—A straggling branched shrub from 3 to 6 feet high, clothed with rusty scales. Leaves elliptical or ovate, green above. Flowers yellowish, succeeded by small orange-red berries.

2. *S. argéntea.* Buffalo-Berry.—This species has narrow lanceolate leaves silvery on both sides, and edible scarlet fruits.

Order XCVIII.—LORANTHÀCEÆ.

Parasitical shrubs, many of the tropical species with brilliantly-coloured flowers. Leaves simple, entire, opposite or alternate, fleshy or coriaceous, veins immersed. Flowers hermaphrodite or unisexual. Perianth of 4 or more free or united segments, with as many stamens as segments, and opposite to them. Fruit baccate, inferior, succulent, 1-celled, 1-seeded. There are 13 genera and about 450 species known, chiefly tropical, and more abundant in the temperate regions of the South than the North. The only indigenous species, Mistletoe, *Viscum álbum*, is perhaps more familiar than any other native plant to town-dwellers. The flowers are small, greenish yellow, unisexual, appearing in April or May. This plant is confined to England and Wales in the British Islands. *Viscus* or *Viscum* is the Latin for birdlime. The application will be apparent from the sticky nature of the berries.

Loránthus Europæus is the only other member of this order occurring in Europe.

Order XCIX.—ARISTOLOCHIÀCEÆ.

Erect or climbing herbs or shrubs with alternate entire or lobed leaves and solitary or clustered axillary hermaphrodite flowers. The unusual shape of the perianth in the genus *Aristolòchia* is the most striking character, but in the only other hardy genus it is regular. Stamens 6 to 12, epigynous, free or adhering to the stigmas. Fruit inferior, capsular or baccate, 3- to 6-celled, many-seeded, splitting between the

cells. The species are estimated at about 180, in eight genera. Most abundant in South America.

1. ARISTOLÒCHIA.

Erect herbs or climbing shrubs with cordate entire or lobate leaves and axillary clustered or solitary pendulous flowers. Perianth tubular, curved or straight, with an oblique trilobate limb. Stamens 6; anthers adhering to the stigma. Capsule 6-valved. There are 160 species, chiefly tropical. The name is of Greek origin, founded on its reputed medicinal properties, as is also the English one, Birthwort.

1. *A. Clematìtis.*—An erect perennial with simple stems, ovate-cordate petiolate glabrous leaves, and clustered axillary yellow flowers, produced all through the Summer. A European species, occasionally seen as a garden outcast in Britain.

2. *A. Sìpho* (fig. 212), Dutchman's Pipe.—A hardy



Fig. 212. Aristolochia Sipho. (⅛ nat. size.)

deciduous climbing shrub with very large glabrescent leaves and yellow and purple streaked flowers, appearing in Summer. A native of North America.

Ásarum Europæ̀um is a tufted evergreen herb with radical

reniform leaves and small solitary pedunculate lurid-purple flowers. Perianth regular, campanulate, trilobate. Stamens 12. Capsule bursting irregularly.

The *Piperàceæ* or Pepper Order contains upwards of 500 species, but, with the exception of a Japanese species, none will flourish in the open air in this country. They are erect shrubs, or trees, or herbs with jointed stems, usually alternate simple-nerved leaves, and spicate inconspicuous flowers and 1-seeded berries.

Piper Futokadsùra is the Japanese species alluded to above. It is a deciduous shrub or tree with slender branches, ovate-lanceolate acuminate entire glabrous leaves, and bright red fruits.

Order C.—EUPHORBIACEÆ.

Taken in its entirety this is a very large order, and many of the tropical genera have a distinct calyx and corolla; but the following diagnosis includes only those genera coming within our province. Herbs with a milky juice, or shrubs, or trees. Leaves alternate or opposite, simple. Flowers inconspicuous, unisexual, often involucrate. Perianth none, or 2- to 5-lobed. Stamens 1 or more, sometimes very numerous. Fruit capsular, 2- or 3-celled; cells 1- or 2-seeded; seeds pendulous, albuminous.

1. EUPHÓRBIA.

The hardy species are annual or perennial herbs, often woody at the base. Leaves opposite or scattered. Inflorescence terminal, umbellate or panicled. Flowers involucrate, several male and one female in each head. Perianth none, but represented by the involucral lobes, the latter having thick often viscid glands in the sinuses. Male flower consisting of a solitary stamen on a jointed stalk. Female flower naked, on an elongating stalk; capsule 3-lobed, 3-celled, each cell containing a solitary pendulous seed. This is a vast genus, comprising 700 species of widely different habit and aspect, occurring in all regions except the coldest. The name is the same applied by the ancient Greeks to some of the species.

1. *E. Lathŷris.* Caper Spurge.—A biennial 3 to 4 feet high with opposite glabrous and glaucous sessile lanceolate-oblong acute leaves rounded or cordate at the base. Umbels 3- or 4-rayed; involucral bracts large, cordate. Capsule

smooth. A native of the South of Europe, and naturalised in some parts of Britain.

2. *E. Cyparíssias.*—This is a dwarfer denser perennial species with sessile glaucous linear entire leaves and many-rayed terminal umbels. Bracts cordate, obtuse. Capsule granulate. A European species occurring as an introduced plant in Britain.

E. amygdaloìdes is the tall perennial species so abundant in copses in the South of England; and *E. Helioscòpia* is the common annual species.

2. RÍCINUS.

Small trees or herbs with stout succulent jointed stems and alternate palmately-lobed dentate leaves on long petioles, bearing a saucer-shaped gland at the junction of the petiole and blade. Flowers monœcious, in terminal spikes. Perianth 3- to 5-parted. Male flowers having numerous stamens in separated bundles. Fruit capsular, prickly, 3-celled, 3-seeded. Seeds oval-oblong, having a spongy excrescence at one end, mottled grey and brown. The species are natives of India and Africa, though they are now widely dispersed in warm countries. The name is the Latin *ricinus*, a tick, from the resemblance of the seeds to that insect.

1. *R. commùnis.* Palma-Christi, Castor-oil Plant.—Though perennial, and attaining the dimensions of a small tree in warm climates, this is treated as an annual with us. As such it grows from 4 to 6 feet or more high, bearing large handsome peltate palmately-lobed leaves. There are several varieties, differing in the colour of the stems, leaves, and flowers. *R. c. màjor* is a tall variety 6 to 8 feet high with glaucous fistular stems slightly tinged with purple, and very large acutely lobed leaves. *R. c. mìnor* is about half the stature of the last, with similar but smaller foliage. *R. c. sanguíneus* is a handsome tall variety with brownish red stems, petioles, and flowers. The immense leaves are otherwise green, not glaucous.

R. Africànus is a distinct species with a branching head and much smaller usually 5-lobed leaves, and 6 distinct stigmas instead of 3 forked ones.

These are very showy and handsome foliage plants either singly or in groups.

3. BÚXUS.

Evergreen shrubs or small trees with alternate exstipulate leaves and axillary bracteolate clusters of polygamous flowers. Perianth of 4 segments in the male, and 4 to 12 segments in the female flowers. Stamens 4. Cells of the capsule 1- or 2-seeded. Besides the hardy species, there are several others in Africa and the West Indies. The name is derived from the Greek appellation *πύξος*.

1. *B. sempervìrens.* Common Box.—This handsome shrub is indigenous in Surrey, covering a large area on Box Hill.

The varieties in cultivation are numerous, both variegated and green. There is the dwarf bushy form used for edging, and several varieties with gold and silver striped foliage. *B. s. myrtifòlia* is a robust form with relatively large coriaceous foliage; and *B. s. rosmarinifòlia* is a dwarf bush with slender branches and narrow leaves. The names of the varieties, *arborèscens*, *angustifòlia*, *rotundifòlia*, etc., suggest their characteristic features.

2. *B. Baleárica.*—This is a more robust-growing species with yellowish green oblong-elliptical emarginate coriaceous leaves about 2 inches long with a cartilaginous margin. The female flowers only are sessile in this species, whilst in *B. sempervìrens* those of both sexes are sessile. This handsome evergreen shrub is a native of Minorca.

B. Japónica is a variable species closely allied to the common European *B. sempervìrens*, differing in the large dilated furrowed rudimentary ovary of the male flowers.

Order CI.—MORÀCEÆ.

A small order of trees and shrubs with a milky juice, closely related to our native Stinging-Nettles, and sometimes considered as forming a tribe of the same family. Leaves alternate, simple, entire or lobed, often rough to the touch, and provided with large convolute stipules. Flowers unisexual, inconspicuous, usually arranged in dense spikes, heads, or catkins. Male flowers with or without a perianth and 3 or 4 stamens. Female flowers with a 3- to 5-lobed or -partite inferior perianth. Fruit composed of 1-seeded nuts or utricles covered by the succulent perianth, collected in heads or enclosed in a fleshy recep-

tacle. The genus *Ficus* constitutes the great bulk of this order; its species occurring in great abundance in the tropics. There are about a dozen genera and 250 species, none of which are indigenous in Europe.

1. FĪCUS.

This large genus is represented by but one hardy species, *F. Cárica*, Common Fig, a native of Asia Minor. It is equally deserving of cultivation for its ample and distinct foliage and luscious fruit, though it appears to flourish nowhere so well as in the chalky districts of the South of England. We ought to mention the peculiar nature of the 'fruit,' which is a fleshy hollow receptacle almost closed at the top, and including numerous crowded male and female flowers. Species of this genus occur in all tropical countries, but they are especially numerous in Asia.

2. MŌRUS.

Small trees with large lobed or entire hispid leaves and fertile and sterile flowers in separate spikes. Perianth quadripartite. Stamens 4. Compound fruit formed of the 1-seeded achenes covered by the fleshy persistent perianth. A genus of few Asiatic and North American species. The name is from *μορέα*, the Greek appellation of *M. nìgra*, the Mulberry. This is supposed to be a native of Western Asia, and is the handsomest, hardiest, and most useful of the genus for planting in this country. *M. álba*, a native of China, is the species so extensively cultivated in the South of Europe for supplying food for silkworms, but it is too tender to withstand the severity of our winters. *M. rùbra* is a North American species of rather larger stature than the preceding, occasionally attaining a height of 70 or 80 feet.

Broussonètia papyrífera, the Paper Mulberry, is a native of China and Japan. It is a deciduous tree closely resembling the Common Mulberry, but readily distinguished, as it is diœcious, and the male flowers are in longer drooping catkins. The foliage is variable, according to the age and variety.

Maclùra aurantìaca, Osage Orange or Bow-wood, is a large deciduous tree in its native country, but is commonly grown as a bush for forming hedges, for which it is well adapted, being armed with stout spines. The flowers are inconspicuous, but the fruit is from 3 to 5 inches in diameter, and of a bright golden yellow.

Order CII.—CANNABINÀCEÆ.

A small order comprising only two genera, each of which is limited to a single species. In technical characters these plants are scarcely different from the *Moràceæ*, the main distinction lying in the fruit and seed. *Cánnabis satìva*, Hemp plant, is an erect dicœcious annual 6 to 10 feet high with elegant digitate leaves, racemose male flowers having a 5-lobed perianth and 5 stamens, and spicate female flowers with a membranous spathaceous perianth open on one side. The native country is not known with certainty, probably Western Asia. *Hùmulus Lùpulus*, the Hop, is a rather common twining plant in the South of England, though doubtless better known in its cultivated forms. It is easily recognised by its scabrid twining stems, palmately lobed leaves, and female flowers in bracteate spikes or catkins. The latter constitute the Hops of commerce.

Order CIII.—ULMÀCEÆ.

Trees with a watery juice. Leaves deciduous, alternate, simple, usually more or less hispid, and often oblique at the base. Stipules caducous. Flowers hermaphrodite or polygamous, arranged in clusters or fascicles. Perianth inferior, persistent, 4- to 9-lobed. Stamens 4 to 9; filaments adnate to the perianth. Fruit 1- or 3-celled, indehiscent, drupaceous or membranous, and furnished with a circular wing. Seeds solitary, pendulous. This order includes about six genera and fifty species. Natives of the northern temperate zone.

1. ÚLMUS.

Flowers appearing in Spring before or with the leaves, usually all perfect; fruit 2-celled, winged all round. Perianth 4- to 9-lobed. Stamens 4 to 9. The species are widely dispersed. The ancient Latin name.

1. *U. montàna.* Wych or Scotch Elm.—A large indigenous tree attaining a height of 120 feet, with spreading branches and large ovate-oblong doubly-serrate acuminate leaves. Fruit produced sparingly; seed in the centre of the oblong or orbicular

samara. The forms named *màjor*, *glàbra*, *stricta*, etc., are referred to this species, and there are many other varieties in cultivation, including one with exceedingly handsome ample foliage and pendulous branches. The forms called *plumòsa* and *filicifòlia* also appear to belong to this species. The former is very robust, and has very large distichous leaves, whilst in the latter they are deeply pinnatifid. The Wych Elm is considered to be indigenous in North Britain and throughout temperate Europe and Siberia.

2. *U. campéstris*. Common Elm.—This differs from the last in its smaller foliage, more erect habit, and usually greater profusion of fruits, though it rarely ripens its seed. Seed above the centre of the obovate or oblong samara. *U. suberòsa* and a host of other varieties are considered as belonging here, but the great diversity both in foliage and habit renders it difficult to assign some of them to their proper place. Amongst some of the most striking we may mention:—*Berárdi*, of slender habit and very small foliage; *fastigiàta*, an erect-growing form with small foliage; and *microphýlla péndula*, with slender drooping branches and small leaves. Besides these there are some slender variegated forms, both erect and pendulous, and edged or blotched with silver or gold; but they are too numerous to be included here, and as the names they bear in nurseries usually describe their peculiarities it is unnecessary. Although now very common, this is supposed to be an introduced tree in Britain, coming from the South and centre of Europe.

Two or three of the American species are met with in some collections, the commonest of which is *U. Americàna*. This has large abruptly acuminate obovate or oblong leaves, pedicellate flowers in dense fascicles, and ciliate glabrous fruits. *U. alàta*, another American species, has corky winged branches; and *U. racemòsa* has racemose flowers.

2. PLANÈRA.

Trees very similar to the Elms in habit and foliage, though usually with a naked trunk and branched head. Flowers polygamous. Perianth 4- or 5-lobed; stamens 4 or 5. Fruit 1- or 2-celled, 1- or 2-seeded, nut-like, and covered with protuberances, not winged. The species are natives of North America, the Caucasus, Siberia, and Japan. This genus was named after a German botanist.

1. *P. Richárdii*, syn. *P. crenàta.*—This is a handsome deciduous tree from 60 to 80 feet high with oblong deeply crenate leaves and smooth deciduous bark. A native of the Caucasus, by no means so common in our parks as it deserves to be, for it is perfectly hardy, though it rarely flowers in this country.

P. aquática, syn. *P. ulmifòlia*, is a North American species with serrated foliage, of much smaller stature and less hardy. *P. Japónica* is a similar Japanese species recently introduced.

3. CÉLTIS.

Moderately large trees or shrubs with strongly-nerved leaves, fascicled or racemose greenish polygamous or hermaphrodite flowers succeeded by small 1-seeded drupaceous fruits. The few species described are widely scattered, ranging from the Mediterranean region through Central Asia to China. *Céltis* is a classical name for the Lotus.

1. *C. austràlis.* Nettle Tree or Tree Lotus.—A handsome tree from 30 to 40 feet high with a straight trunk and long slender tough pliant branches. Leaves oblong-lanceolate, acuminate, deeply serrate, hispid above, softly pubescent beneath, unequal at the base. Fruit black, very sweet and edible. A native of the Mediterranean region.

C. occidentàlis, Sugar-berry or Hack-berry, is a very variable North American species, and includes the forms called *C. crassifòlia*, *C. pùmila*, and *C. Audibertiàna.* The ordinary form has reticulated cordate-ovate or lanceolate sharply serrate leaves and slender-stalked flowers. The variety *crassifòlia* is remarkable for its fleshy foliage.

Order CIV.—PLATANÀCEÆ.

Highly ornamental deciduous trees with large elegantly lobed leaves on long petioles, and conspicuous sheathing stipules. Flowers destitute of perianth, monœcious, in separate naked spherical bracteolate solitary or clustered catkins, on long pendent peduncles. Male flowers with 1 stamen. The 1-celled 1- or 2-seeded nuts or achenes, are arranged in dense heads. The order is restricted to a solitary genus whose few species occur in North Africa, Western Asia, and North America.

1. PLÁTANUS.

Characters of the order. Name from πλατύς, broad, in allusion to the foliage.

1. *P. orientàlis.* Common Plane.—The forms of this beautiful tree are very numerous, differing chiefly in the shape and lobing of the leaves. The variety *acerifòlia* is one of the commonest in cultivation, frequently bearing the erroneous name of *P. occidentàlis.* It is the form known as the London Plane, on account of its being generally planted in the parks. An erect-growing tree with usually three-lobed leaves, or if 5-lobed less deeply so than in the typical form. The typical *orientàlis* is a more spreading tree with very large deeply 5-lobed leaves, cordate or truncate at the base. The variety *cuneàta* has the leaves distinctly wedge-shaped at the base; *laciniàta* very deeply much divided leaves; and *variegàta* variegated foliage.

2. *P. occidentàlis.* American Plane.—This differs from the last in its less deeply lobed more coriaceous pubescent leaves, and in the fertile catkins being usually solitary on the long peduncles. It is very rare in British gardens, and not so hardy the Common Plane.

Order CV.—JUGLANDÀCEÆ.

Handsome deciduous trees, often with a resinous juice. Leaves alternate, unequally pinnate, exstipulate. Flowers small, dicœcious, inconspicuous, often appearing before the leaves; males in catkins, females solitary or clustered. Calyx irregularly lobed. Petals very small or wanting. Fruit a drupe, inferior, 2- or 4-celled at the base, and 1-celled at the apex, 1-seeded. Seed destitute of albumen, wrinkled and lobed, or divided by the partial dissepiments. There are four genera, including less than thirty species, natives of the temperate or warm parts of the northern hemisphere.

1. JÚGLANS.

Male flowers in simple catkins, having a calyx of 3 to 6 irregular lobes, and usually numerous (more than 8) stamens. The fleshy fibrous epicarp of the fruit bursting irregularly, endocarp or shell 2-valved, usually with deep furrows. The species

are from North America and the mountains of Asia. The name is a corruption of *Jovis glans*, literally Jupiter's Nut.

1. *J. règia.* Common Walnut.—This handsome and useful tree needs no description; but we may call attention to some of the better varieties. Those most valued for their nuts are the Highflyer, Titmouse, or *ténera* (thin-shelled), and *serótina*, the latter being valuable on account of its flowering season being a month later than the ordinary form, and thus escaping the Spring frosts. There is also a very large-fruited variety called the Double Walnut, whose shells are often polished and hinged, and filled with trinkets. The varieties most esteemed for their foliage besides the ordinary one are *laciniàta*, *heterophýlla*, *variegàta*, *monophýlla*, and *asplenifòlia*. The names are sufficiently descriptive of the peculiarities of the several varieties. Native of Asia, from the Caucasus to China.

J. nìgra, Black Walnut, is an erect tall-growing tree, with more numerous toothed leaflets hairy beneath, and a more persistent husk. Nut spherical, corrugated, edible, but not equal to the common Walnut. It is a native of the Western States of North America. There are some varieties of this, and one called *intermèdia*, supposed to be a hybrid between this and the foregoing. *J. cinèrea*, Butternut, is also a North American species. It has greyish bark, glutinous branches, and oblong fruits with only one partition at the base.

2. CARŸA.

This differs from the last genus in having the male catkins usually in threes, each flower with 8 or fewer stamens, and the epicarp or husk splits into 4 regular valves, with a smooth endocarp or shell. The species are all North American. Κα*ρύα* is an ancient name of the Walnut. These handsome trees are almost unknown in England, and rarely quoted in our nursery catalogues, probably on account of their not being very hardy.

C. olivæfórmis, Pecan-nut, is an elegant slender tree, and the only species bearing really palatable nuts, which are imported in small quantities. They are smooth, 4-ribbed and olive-shaped. *C. álba* is the Shell-bark Hickory, valuable for its timber and Hickory nuts. *C. glàbra*, syn. *porcìna*, is the Pig-nut or Broom Hickory. *C. amàra* is called Bitter Nut or Swamp Hickory, and *C. tomentòsa* is the Mocker Nut or White-heart Hickory. The tough young wood and the highly coloured older timber of some of the species is in great request.

Pterocarya Caucásica and *Japónica* are rare trees in cultivation. They are distinguished by their female flowers being in catkins, and the fruits furnished with two lateral wings. *Ph. fraxinifòlia* is another name of the Caucasian species. *Fortunæa Chinénsis* is a shrub or tree from Northern China with smooth sharply serrated leaflets, and the female flowers in dense bracteolate cones or spikes. The fruit is small, 2-winged and concealed beneath the rigid scales or bracteoles.

Order CVI.—CUPULIFERÆ.

This is an important order, including nearly all our indigenous timber trees, besides a large number of exotic ornamental and useful species. Leaves deciduous in nearly all the hardy species, alternate, simple, entire or lobed or toothed, stipulate. Flowers monœcious. Perianth composed of 5 or more segments, or absent in the male flowers, which are solitary or clustered or in catkins with or without bracts. Female flowers with an adnate perianth, sessile in a coriaceous involucre formed of free or connate bracts; ovary inferior, 2- or 3- or several-celled, with one or two ovules in each cell. Fruit a glans or nut, seated on or enclosed within the cupular involucre, by abortion usually 1-celled and 1-seeded, the other cells becoming obliterated, rarely 2-seeded. Seeds large, destitute of albumen, and having large thick cotyledons. 12 genera, and about 280 species belong to this group. The species are most abundant in northern temperate regions, but occur in the south, and sparingly on the mountains of tropical countries.

1. QUÉRCUS.

Evergreen or deciduous trees or shrubs. Male flowers in loose slender catkins; perianth 5- to 10-lobed; stamens indefinite, with slender exserted filaments. Female flower solitary, perianth 3- to 8-lobed, ovary 3-celled, styles 3. Fruit ovoid or oblong, 1-seeded, seated in a cupule of imbricated scales. There are about 250 species belonging to this genus, none of which occur south of the equator. The name is of classical Latin origin.

1. *Q.Ròbur.* Common Oak.—This is the most majestic of our indigenous trees, though in height it is usually exceeded by

the Elm and other species, very rarely attaining to 90 or 100 feet. There are two extreme forms which have been classed as species, but intermediate connecting varieties have since been discovered. *Q. R. sessiliflòra* has petiolate leaves and nearly or quite sessile acorns; *Q. R. pedunculàta* has sessile leaves and pedunculate acorns. This species has a wide range of distribution in Europe and Asia. There are several slight varieties, and a few sufficiently distinct to plant in large collections, such as *péndula*, *heterophýlla*, *pectinàta*, *varieyàta*, and *pícta*, the latter with pink, white and green foliage.

2. *Q. Cérris.* Turkey Oak.—A very handsome deciduous South European species of more rapid and symmetrical growth than the native Oak. The leaves in the common form are usually smaller and more finely lobed and sharply toothed, and the fruit is not ripened till the second year. The bracts forming the cup or involucre of the long narrow acorn are long, narrow and spreading. This is the only exotic deciduous species commonly planted, and of this there are many fine specimens in various parts of this country. Although the leaves change to brown in Autumn, they persist during a greater part of Winter. There are several varieties, including a very beautiful silver-variegated one, and another with large almost evergreen foliage called *Fulhaménsis*.

3. *Q. coccínea.* Scarlet Oak.—A highly ornamental species with large deciduous oblong-oval sinuately lobed petiolate glabrescent leaves about a foot long. Acorn small, ovoid or globular, half-immersed in a scaly involucre. This is a handsome fast-growing large tree of pyramidal outline, and especially conspicuous in Autumn when the foliage changes to a bright scarlet. It is a native of North America, and less valuable as a timber-tree than many other species.

Q. álba, White Oak, *Q. macrocárpa*, Bur Oak, *Q. rùbra*, Red Oak, and *Q. tinctòria*, Yellow-barked Oak, are other North American ornamental and useful species, but they are almost unknown in this country. *Q. Ægilops*, the Valonia Oak, furnishes the very large acorns imported from the South of Europe into this country for tanning purposes. It is rarely seen, except in a very small state, in this country.

4. *Q. Ilex.* Evergreen Oak.—The only species of the evergreen section commonly seen. It is variable in foliage from narrow-lanceolate to oblong or nearly rotundate, and more or less prickly toothed or quite entire. The acorns are small and

half-immersed in the closely imbricated cup. Native of the South of Europe.

Q. Sùber, the Cork Oak, is very near the last in general aspect, and is equally variable in foliage, but the leaves have longer petioles, and the bark, instead of being smooth, is deeply furrowed and corky. *Q. occidentàlis* is often confused with the true Cork Oak, but the latter ripens its acorns in one season, whereas the former requires two to bring them to maturity.

2. FÀGUS.

Deciduous or evergreen trees with entire or toothed leaves. Male flowers in small bracteate heads or slender drooping peduncles; perianth 5- to 7-lobed; stamens 8 to 16. Female flowers 1 to 3 together in an involucre of 4 bracts, which eventually hardens and encloses the triangular or winged usually one-seeded nuts. There are about fifteen species in the temperate regions of the north and south. The name is from *φάγω*, to eat, in allusion to the edible seeds.



Fig. 213. Fagus sylvatica (Common Beech).

1. *F. sylvática.* Common Beech (fig. 213).—If we give the Oak the palm for grandeur, we must award the Beech the palm for beauty. It ordinarily attains a height of 60 to 80 feet, and in rare instances it exceeds 100 feet. It would be superfluous to describe the typical form, but there are some varieties that we must not omit to mention. The most striking of these is *F. s. purpùrea*, the Purple Beech, having deep purple foliage, forming a fine contrast with the

verdant foliage of other trees. *F. s. cùprea*, the Copper Beech, has a less pleasing tint, and should not be planted where only one is wanted. *F. s. fòliis argénteo-variegàtis*, Silver-striped Beech, and *F. s. fòliis aùreo-variegàtis*, Gold-striped Beech, are also very pretty. *F. s. péndula* and *F. s. purpùrea péndula* are fine robust weeping trees. Besides the foregoing there are several with more or less lobed or bipinnatifid leaves, as *F. s. incìsa*, *F. s. aspleniifòlia*, and *F. s. quercifòlia*; and *F. s. macrophýlla* has larger foliage than the common form. The Beech is found from Norway to Asia Minor, reappearing in Japan.

F. ferrugìnea, syn. *F. sylvàtica*, var. *Americàna*, is a closely allied North American species, inferior in point of beauty. It is distinguished from the European species by its narrower longer leaves which are clothed with rufous hairs when young.

F. antárctica is a small-leaved deciduous species from the extreme South of America; and *F. betuloìdes* is an evergreen species from the same region with very small coriaceous ovate toothed leaves. This is quite hardy in exposed situations in the South-west of Britain.

3. CASTÀNEA.

Deciduous trees or shrubs having the male flowers clustered on long naked cylindrical catkins, with a 5- or 6-partite perianth and 8 to 15 stamens. Female flowers 2 or 3 together in a prickly 4-lobed involucre, which eventually completely encloses the coriaceous glossy brown fruits or nuts. The species are widely dispersed in the north temperate zone. Named by the ancients after a town in Thessaly.

1. *C. vésca.* Sweet or Spanish Chestnut.—A gigantic tree with rugged bark and often a twisted trunk. Leaves glabrous, oblong-lanceolate, acute, coarsely and sharply serrate. Flowers yellowish green, appearing in June. This handsome tree appears to have been originally introduced into Europe from Asia Minor, and has been extensively cultivated for a very long period for its edible nuts. The varieties worth cultivating for ornamental purposes, besides the ordinary one, are not numerous. Perhaps the *C. vèsca fòliis aùreo-marginàtis*, with golden-edged foliage; and *C. v. heterophýlla dissécta*, in which the leaves are divided into thin thread-like segments, are the best.

4. CARPÍNUS.

Deciduous small trees. Perianth none. Male flowers in lateral drooping catkins, with 6 to 12 stamens in the axils of the ovate acute bracts. Female flowers in terminal pendulous bracteate catkins, 2 at the base of each deciduous bract; bracteoles lobed. Fruit 1-celled, 1-seeded, somewhat woody, strongly nerved, enclosed in the enlarged lobed bracteole. Four species are known, all natives of the north temperate zone. The name is of classical origin.

1. *C. Bétulus.* Hornbeam.—A small indigenous tree resembling the Beech in foliage, but readily distinguished by the opaque not shining doubly serrate leaves, simply pubescent not silky, hairy below, and the winged fruit. Indigenous in the South of England.

5. OSTRŸA.

Deciduous trees, very near the Hornbeams in foliage, but having the female flowers in terminal drooping catkins, each enclosed in an inflated membranous involucre, which enlarges and closes over the fruit. The mature female catkins strongly resemble those of the Hop, giving the tree a very singular and pretty appearance. There are three or four species, natives of Europe, Asia, and North America. *Ostrya* is the ancient Latin name of *O. vulgàris.*

1. *O. vulgàris*, syn. *O. carpinifòlia.* Hop-Hornbeam.—A moderate-sized tree with a much-branched rounded head and cordate-ovate acuminate leaves. A native of the South of Europe.

O. Virgínica, a similar tree, bears the names Iron-wood and Lever-wood in North America.

6. CÓRYLUS.

Deciduous shrubs or small trees, producing their flowers before the leaves. Male flowers devoid of perianth, arranged in clustered pendent catkins. Stamens 4 or 8. Female flowers minute, few together, in lateral and terminal bracteolate clusters. Fruit by abortion 1-celled and usually 1-seeded, more or less enclosed in the enlarged leafy involucre, whence the generic name, from *κόρυς*, a helmet. There are about seven species distributed over the temperate regions of the north. None of them are, strictly speaking, ornamental; but *C. Avellàna*, the

Hazel, enters so largely into the composition of our copses and plantations, that it deserves mentioning here. From this have sprung the varieties producing the Spanish, Filbert, Cob, and other nuts. There is also a variety in which the large leaves have a purplish blotch in the centre.

Order CVII.—MYRICÀCEÆ.

Shrubs or small trees, usually covered with resinous glands or dots. Leaves simple, alternate, with or without stipules. Flowers monœcious or diœcious, in simple or compound catkins. Perianth none. Stamens 2 to 16, in the axil of each bract. Ovary surrounded by hypogynous scales. Fruit drupaceous, often clothed with fragrant waxy secretions, 1-celled, 1-seeded; seed erect. A small order limited to one genus by some botanists, and divided into two by others; the species number ing between twenty and thirty.

1. MYRÌCA (including *Comptònia*).

Characterised as above. The name μυρίκη was applied by the ancients to the Tamarisk or some other sweet-scented shrub. The species occur in North and South America, South Africa, Atlantic Islands, and Europe.

1. *M. Gàle.* Sweet Gale, Bog-Myrtle, or Sweet Willow.—This is the only European species, and it is also a native of Britain. It is a dwarf fragrant shrub from 2 to 4 feet high with deciduous linear lanceolate-obovate toothed or entire exstipulate leaves from 2 to 3 inches long. Male and female flowers in separate catkins on the same individual, appearing before the leaves; male catkins clustered. Found in boggy places and on moors.

2. *M. cerífera.* Candleberry, Bayberry, or Wax Myrtle.—A small shrub about 4 to 6 feet high with oblong or obovate-lanceolate entire or sinuately toothed exstipulate leaves and scattered male catkins. A native of North America.

3. *M. asplenifòlia*, syn. *Comptònia asplenifòlia.* Sweet Fern.—A somewhat straggling irregularly branched small shrub with linear lanceolate pinnatifid stipulate slightly hairy leaves; lobes crowded, rounded. This is the prettiest and most interesting of the hardy species, growing about 3 feet high, and producing its inconspicuous flowers a little before the leaves. North America.

Order CVIII.—BETULÀCEÆ

Deciduous trees or shrubs with simple alternate stipulate leaves and monœcious flowers in catkins. Perianth none or bract-like. Flowers 2 or 3 together at the base of the bracts of the catkin. Stamens 2 to 5, with forked filaments and divergent anther-cells, or simple with connate anther-cells. Ovary 2-celled; cells 1-ovulate. Fruit a dry compressed lenticular often winged indehiscent nut, by abortion 1-celled and 1-seeded; seed pendulous. This order is limited to the two following genera, whose species are estimated at about thirty-five. They are scattered over the north temperate zone and the mountains of South America.



Fig. 214. Betula alba (Common Birch).

1. BÉTULA.

Trees or shrubs in which the scales of the female catkin are thin and deciduous, and usually trilobate. Stamens 2. The species are confined to the northern hemisphere. The name is that used by the ancients.

1. *B. álba.* Common Birch (fig. 214).—This graceful indigenous tree whose silvery white deciduous bark and slender branches render it so effective in a landscape, is represented by several varieties, differing mainly in the foliage from the ordinary form. But the first to claim our attention is *B. a. péndula*, the Weeping Birch, one of the most distinct and desirable of this class of trees, being of moderate size when fully developed. The

foliage of the wild forms is extremely variable in size and outline, and there are some very distinct varieties in cultivation, such as *B. a. laciniàta*, with deeply cut leaves, and *B. a. populifòlia*, the American variety, with large triangular acuminate leaves. This species has a very wide range through Europe, Northern Asia, and North America. The only objection to the Birch is its short life.

B. nàna is a mountain species occurring in Scotland, and having about the same general distribution as the last. There are also several North American hardy species, but they are too near in aspect to our indigenous species to be desirable except in a general collection. Some of them, however, are of larger stature and more valuable as timber trees.

2. ÁLNUS.

Trees and shrubs in which the fleshy scales of the persistent cone-like female catkins become indurated and ligneous as they approach maturity. Stamens 3 to 5. This genus has about the same range in the northern hemisphere as the last, and extends to South America. The ancient Latin name of the genus.

1. *A. glutinòsa.* Alder.—This is the only native species. It is usually a shrub or small tree, though it occasionally attains a height of 50 to 70 feet, and it abounds in the vicinity of rivers and brooks. The ordinary variety may be distinguished by the black bark, glutinous branches, and young leaves, which are of an orbicular or obovate form with a wavy serrulate margin. The female catkins are borne in racemes, and persist during the winter. The variety *aùrea* has golden foliage, and *imperiàlis*, *laciniàta*, *asplenifòlia* and *quercifòlia*, have more or less lobed or cut foliage; the first having elegant drooping branches and fern-like leaves. This species occurs throughout Europe, North Africa, and North Asia.

2. *A. cordifòlia.*—A very distinct South European species, having more the aspect of a Poplar, the leaves being nearly or quite glabrous, and somewhat shining, ovate or oblong-cordate in outline, with a serrate margin. It is a fast-growing tree with light-coloured bark.

A. incàna and *A. serrulàta* are North American species, of no especial interest to horticulturists.

Order CIX.—SALICÌNEÆ.

Deciduous trees or shrubs with simple alternate stipulate leaves and diœcious flowers usually preceding the leaves and destitute of a distinct perianth. Both male and female flowers are disposed in deciduous catkins and solitary at the base of the bracts. Stamens 1 to indefinite. Fruit a 1-celled many-seeded capsule dehiscing in two revolute valves. Seeds minute, furnished with a tuft of silky hairs at one end. There are two genera and about 200 species, chiefly in the north temperate and arctic zones, and unrepresented in Australasia.

1. SÀLIX.

In this genus the leaves are either narrow or, if broad, small. Catkins usually erect, with entire scales. About 160 to 180 species are known, but many of them are so similar in aspect that they are difficult to determine from descriptions. And then the varieties either natural or hybrid are so numerous as to render it impossible to classify them satisfactorily. The ancient Latin name, said to be of Celtic origin.

The following are a few of the more desirable ornamental species, including some of the commoner indigenous ones.

1. *S. frăgilis.* Crack Willow.—A large indigenous tree 60 to 90 feet high. Leaves lanceolate, glandular-serrate, with a long acuminate point. Petiole short, not glandular; catkins on short leafy shoots, rather long and slender, appearing with the leaves. Stamens 2. Capsule distinctly pedicellate. *S. Russellĭàna*, the Bedford Willow, differs only in having linear-lanceolate leaves and more spreading branches.

2. *S. álba.* White Willow.—This is also a large tree and equally common with the last. It has very long linear-lanceolate glandular serrate acuminate leaves clothed with silky hairs on both sides when young. Stamens 2. Capsule glabrous, almost or quite sessile. There are three varieties, distinguished as follows:—*álba* proper, young twigs olive green, mature leaves silky on both sides; *cærùlea*, adult leaves glabrous and glaucous beneath; *vitellĭna*, Golden Osier or Willow, young twigs bright yellow.

3. *S. Căprea.* Common Sallow, Goat Willow, or Palm.—This is an extremely variable species and the commonest of the genus

in hedgerows and waste places. It forms a large shrub or small tree, which blooms earlier than any other native species, producing its short thick silky catkins before the leaves. The reticulated leaves are silky, hairy below, and vary in outline from lanceolate to oblong or rotundate, and crenate or entire at the margin. Scales of the female catkins tipped with black. *S. cinèrea*, *S. aquática*, and a host of other names belong to this species. *S. c. péndula* is the Kilmarnock Weeping Willow.

4. *S. purpùrea.* Purple Osier.—A small indigenous shrub with reddish or purple bark. Leaves often opposite, glabrous, lanceolate, serrulate, glaucous beneath. Catkins sessile, narrow, with dark purple scales. Stamens 2; filaments more or less combined, a character peculiar to this amongst British species. This includes a large number of forms, but only one calls for mention, namely, *péndula*, commonly known as the American Weeping Willow.

5. *S. pentándra.* Bay Willow.—This is a very distinct and handsome species with broader thicker more shining foliage than any of the foregoing, and five or more stamens. It is, moreover, the latest in bloom of British species, producing its bright yellow catkins after the appearance of the leaves.

6. *S. triándra.* Almond-leaved or French Willow.—A small tree with glabrous linear-lanceolate glandular-serrate leaves and glandular petioles. Stamens 3. This species is commonly planted in Osier beds.

S. viminàlis is another common Osier, distinguished by its entire leaves with a revolute margin and sessile catkins. *S. rèpens* is the common creeping or trailing species. *S. péndula*, syn. *S. Babylònica*, is the old Weeping Willow, with very long slender drooping branches and narrow leaves. It is a native of China, according to Professor Koch, not of Western Asia, as formerly supposed, and is sometimes known as Napoleon's Willow. The female plant only is in cultivation. Another handsome Weeping Willow, in cultivation under the erroneous names *Siebóldii* and *Japónica*, is called *elegantíssima* by Koch.

2. PÓPULUS.

Deciduous trees whose scaly buds are often covered with a clammy resinous exudation. Catkins pendulous, appearing before the leaves; scales irregularly lobed or cut. Leaves usually broad, rounded or angular. The species of this genus

are confined to the northern hemisphere. The generic name is of classical origin.

1. *P. trémula.* Aspen.—An indigenous tree with glabrous buds, pubescent shoots, orbicular-cordate entire or angularly toothed leaves glabrous or pubescent beneath, on long slender laterally compressed petioles. Scales of the rather small catkins ciliate and deeply cut. Stamens about 8. This tree rarely exceeds 50 feet in height, and is remarkable for the almost perpetual quivering motion of the leaves. There is a good weeping variety.

P. tremuloìdes, the American Aspen, is an allied species with roundish-cordate sharp-pointed minutely regularly-toothed leaves. *P. Grèca*, a slight variety of the foregoing, or perhaps the selfsame thing, is represented in gardens by a weeping form.

2. *P. álba*, syn. *P. nívea*, etc. Abele.—A large fast-growing tree with glabrous buds, pubescent shoots, ovate-cordate or deltoid lobed and toothed leaves densely clothed with a cottony down on the lower surface, and long slender petioles. Scales of the catkins ciliate. This is very rare in a wild state, and perhaps not truly indigenous. *P. canéscens*, the Grey Poplar, is a variety with smaller rarely lobed leaves having a greyish tomentum.

3. *P. nìgra.* Black Poplar.—A fast-growing spreading tree from 50 to 80 feet high with glabrous shoots and glutinous buds. Leaves triangular-ovate, acuminate, serrate, rounded at the base, silky beneath when young; petiole slender, compressed. A native of Europe and North Asia, now much planted in this country. There is a narrow-leaved variety called *salicifòlia.*

4. *P. pyramidàlis*, syn. *P. fastigiàta*, and *P. dilatàta.* Lombardy Poplar.—This is very distinct in habit, and easily recognised from all other Poplars by its slender erect branches; but it is nevertheless considered to be a form of the same species as the last. In aspect it is distinct from all other deciduous trees, approaching the close perpendicular growth of the Cypresses. It attains a height of 100 to 150 feet, and is found wild in Southern Europe and the Himalaya mountains.

5. *P. balsamífera.* Balsam Poplar, Tacamahac.—This is the most commonly planted of the North American species, and resembles *P. nìgra* in foliage, but the branches are round, not angular, and the bark more furrowed. The leaves too are quite glabrous, strictly ovate-acuminate, with a rounded

base, serrate margin, and paler reticulated under-surface. The buds are covered with a fragrant resin, whence the specific name. This species is much subject to canker in some soils. *P. suavèolens* is a Siberian form of this species, and there is a variety called *cándicans*, syn. *P. Ontariénsis*, Balm of Gilead Poplar, in which the leaves are broader and cordate at the base. This again is found in nurseries under the names of *macrophýlla* and *cordifòlia*.

6. *P. monilífera*, syn. *P. Acladésca*, *P. Canadénsis*, etc. Necklace Poplar, Cotton Wood.—A tall tree with the young branches slightly angular, and broadly deltoid glabrous shining serrate leaves with spreading prominent nerves, rounded or slightly cordate at the base. The female catkins are very long and pendulous, which suggested the specific name. A native of North America.

7. *P. angulàta*. Carolina Poplar.—This large tree is remarkable for its ample ovate-cordate or deltoid entire or obtusely serrate glabrous bright green leaves, which on vigorous trees are from 6 to 9 inches long, and proportionately broad. The branches are angular or almost winged. A native of North America, and one of the most ornamental and desirable of the genus.

8. *P. grandidentàta*.—A moderate-sized tree with ovate-orbicular coarsely sinuately toothed leaves clothed with a dense white pubescence when young. A weeping variety of this is more frequently seen than the erect one. North America.

There are several other species or forms occasionally seen in gardens, but none of them superior to those enumerated.

Order CX.—CONÍFERÆ.

Trees or shrubs, generally resinous, and for the greater part evergreen. Wood destitute of medullary rays; that is to say, a transverse section does not show the lines from the centre to the circumference so conspicuous especially in the young wood of most exogenous plants. Leaves alternate, opposite, or fascicled in a membranous sheath, often narrow, needle-like and rigid, or reduced to dense imbricating scales, rarely with a flattened limb. Flowers monœcious or diœcious, destitute of perianth: males in catkins, sometimes conoid, with one stamen

or several, and then monadelphous; females in cones or solitary, when in cones two or more at the base of each bract. By some authors these are considered as naked seeds on an open carpellary leaf, and by others as inverted or erect carpels, each containing a solitary erect seed destitute of the usual integuments or coats. For the purposes of this work it matters little which view we adopt, but we shall follow the usual course and refer to them as ovules and seeds. The seed is albuminous, with usually more than two cotyledons, and sometimes as many as 12 in two opposite fascicles. The genera are variously estimated according to the views of different systematists, but they are reduced to about 30 by the more moderate. The species—which are widely dispersed, occurring in most temperate countries, and rare in the tropic and arctic regions—number between 200 and 300. The number of species and varieties in cultivation belonging to this order is very great, though many of them are still very rare, and others are too tender for our climate. We shall confine ourselves to descriptions of the most desirable hardy species.

The genera may be conveniently grouped in three tribes, founded upon the nature of the fruit.

Tribe I.—*ABIETÌNEÆ.*

Flowers usually monœcious. Cones usually large, the scales becoming more or less woody. Ovules and seeds 2 or more at the base of each scale, inverted.

1. PÌNUS.

Regularly branched evergreen trees, often of large dimensions. Leaves needle-shaped, commonly fascicled, 2 to 5 together in a membranous sheath. Male cones or catkins in spikes, furnished with membranous scales. Female cones solitary or clustered with eventually woody scales, usually not reaching maturity in one season. Seeds inverted, 2 at the base of each scale, almost always winged at the base. In most Pines the cone becomes very dense and woody, the tops of the bracts being much thickened, expanded and shield-like. Upwards of 100 species are known, all in the northern hemisphere, and chiefly in temperate regions. The name is from the Greek *πίων*, fat, referring to the resin, and of which the English *pine* is merely an altered form.

§ 1. *Leaves usually two in each sheath.*

1. *P. sylvéstris.* Scotch Pine or Fir.—A tree from 50 to 100 feet high. This is the only species native of the British Islands, and it is now rarely seen in a wild state. The foliage is dense, of a glaucous hue, and from 1½ to 2½ inches long. Sheath small, persistent, nearly black. Cones solitary or 2 or 3 together, about 2 inches long, tapering towards the apex; tops of the scales elevated and ridged, with a square or triquetrous outline and a small shield with a deciduous point. Seeds winged. There are many slight varieties of this species, few of which are worthy of distinctive names or detailed notice, especially as this species is quite superseded for ornamental purposes by others of handsomer growth and aspect. The variety *nàna* is a dwarf bush, *variegàta* has some of the leaves tinged with yellow, and *monophýlla* has the two leaves more or less combined.



Fig. 215. Pinus Laricio.

2. *P. Austrìaca*, syn. *P. nìgricans* and *nìgra*. Austrian Pine.—A handsome tree from 60 to 120 feet high with dense erect rich glossy dark green foliage from 2½ to 4 inches or more long. Sheath short, persistent. Cone reddish-brown, from 2 to 3 inches long, with less elevated smooth and shining scales. Seeds winged. This is perhaps the best of this section for general planting, being equally ornamental with any of the others and sufficiently hardy to develop its beauty in the bleakest and most exposed situations. In fact, it is unrivalled

and invaluable for affording shelter to less robust subjects. Although introduced into Britain so lately as 1835, it now probably numbers as many individuals as all the other species, excluding the Scotch Pine, put together. It is a native of the mountains of Styria and neighbouring districts.

3. *P. Larìcio* (fig. 215). Corsican Pine.—A variable species, similar to the last in general appearance, but the leaves, instead of being erect or appressed, are spreading and curved or wavy. Cone pale brown; scales with a very short point. Seeds winged. This species appears to be very hardy; and it is also very ornamental, though scarcely so effective as the Austrian Pine. The principal varieties are:—*pýgmæa*, a dwarf trailing bush with short rigid foliage; *contórta*, with curved and twisted branches; and *Caramánica* or *Romàna*, a dense bushy form, intermediate in aspect between the Austrian Pine and the present. This species is very abundant in Corsica and other parts of Southern Europe, attaining a height of 100 to 150 feet.

4. *P. Banksiàna*, syn. *P. rupéstris*, *divaricàta*, etc. Scrub Pine.—A dwarf bushy species with rigid divergent leaves about an inch long, or in warmer climates a small tree with longer pale green leaves. Cones about 2 inches long, usually curved, with pointless scales. Seeds winged. A native of the extreme North of America.

5. *P. Pináster*, syn. *P. marítima*, etc. Cluster Pine.—A very distinct species of irregular growth and variable habit. Leaves dark green, from 6 inches to nearly a foot in length. Cones about 4 inches long, in dense clusters; scales pyramidal, angular, with a short straight prickle. Seeds winged. The variety *Hamiltònii* has paler green leaves, and *variegàta* has the foliage more or less variegated with yellow and green. A native of the South-west of Europe, varying considerably in appearance according to situation and the nature of the soil.

6. *P. muricàta.*—A small tree with handsome crowded bright green pliant leaves 3 to 5 inches long, and short pale sheaths. Cones clustered, about 3 inches long, very dense and woody, often oblique; lower scales prominent, furnished with a sharp woody point. Native of California.

7. *P. Mùgho.*—A small tree or shrub with crowded dark green twisted leaves about 2 inches long. Cones usually in pairs, shorter than the foliage; scales with a strong usually curved spine. *P. M. nàna*, the Knee Pine, is a mountain

form rising only 2 or 3 feet from the ground; and *rostràta* or *montàna* has unusually long curved prickles on the cones. Mountainous regions of Central Europe.

8. *P. Pìnea* (fig. 216). Stone Pine, Parasol Pine.—This species is remarkable for its rounded head and intense green foliage from 6 to 8 inches long. Cones about 6 inches long; scales prominent, convex and woody, terminating in a recurved obtuse prickle. Seeds with a very small wing. A native of the Mediterranean region.



Fig. 216. Pinus Pinea.

There are several other species of this section in cultivation, but we must be content with enumerating a few of the better known ones. *P. densiflòra*, Japan; *P. Brùtia*, Italy; *P. Pallasiàna*, syn. *P. Taùrica*, Crimea; *P. mìtis*, *P. ínops*, and *P. resinòsa*, North America.

§ 2. *Leaves usually three in each sheath.*

9. *P. insígnis*, syn. *P. Califórnica*. Oregon Pitch Pine.—This is without doubt one of the handsomest of the genus, though unfortunately rather tender in some localities. It is a large tree of close habit, with crowded slightly appressed dark green slender soft flexible leaves about 4 or 5 inches long, 3 (or more rarely 4) together in a short persistent sheath. Native of California.

10. *P. Benthamiàna*.—A gigantic tree, sometimes exceeding 200 feet in its native country. Branches thick, horizontal, in distant whorls. Leaves from 8 to 12 inches long, flexible, sometimes twisted, not glaucous. Cones clustered, 3 or 4

inches long, with sharp recurved prickles. North-western America. *P. ponderòsa* is said to be identical with this. What we have seen under this name is very near the last, but the branches are slenderer and the leaves shorter, of a darker green.

11. *P. macrocárpa*, syn. *P. Coulteri.*—A large tree with beautiful glaucous foliage and immensely large cones. Leaves 9 to 12 inches long, rigid, sheaths long. This is a very distinct and desirable species. A native of California.

12. *P. Fremontiàna*, syn. *P. monophýlla.*—A small slow-growing tree with glaucous-green rigid curved leaves from 2 to 3 inches long. Cones from 2 to 3 inches long, without prickles. California.

13. *P. radiàta.*—A large tree with slender branches and smooth greyish-green bark. Leaves dark green, 3 to 4 inches long, slender and twisted. Cone about 6 inches long, with thick woody scales. Also a native of California.

P. austràlis, *P. Sabiniàna*, *P. Jéffreyi*, *P. rígida*, and *P. Tæda* are North American species of this section, the first two rather tender. *P. Bungeàna* is a very distinct species of recent introduction, from China.

§ 3. *Leaves usually five in each sheath.*

14. *P. excélsa.* Bhotan Pine.—This is perhaps the most familiar of this group. It is a handsome slender tree from 60 to 150 feet high, with smooth pale bark and drooping branches. Leaves glaucous-green, very slender and flexible, from 4 to 6 inches long. Cone cylindrical, pendulous, 6 to 8 inches long, with broad flat smooth scales. This is the most desirable species of this section as an ornamental tree, being a rapid grower and freely producing its large conspicuous cones. A native of the mountains of Northern India.

15. *P. Stròbus.* Weymouth Pine, White Pine of the Americans.—This is very near the last, differing mainly in the shorter less abundant foliage and shorter cones with thinner scales. Although a very beautiful tree, this must cede the palm to the preceding, as it is of rather loose habit. A native of North-eastern America, where it attains a height of 100 to 150 feet. The varieties *nàna* and *álba* are interesting; the latter has dense short silvery foliage.

16. *P. Cémbra.* Siberian Stone Pine.—This species is remarkable for its slow growth, close erect symmetrical habit,

and crowded appressed dark green and glaucous foliage. Leaves slender, flexible, from 2 to 3 inches long. Sheath small, deciduous, as it is also in the two last. Cone erect, about 3 or 4 inches long. The variety *pýgmæa* is an extremely diminutive Pine, attaining a height only of 5 or 6 feet, it is said, in a hundred years. There is also a variegated and several other varieties, the best of which is *Helvética*, with twisted leaves, some of which are glossy green, whilst others are glaucous and opaque. A very hardy species, occurring in the mountains of Central Europe and in Siberia.

17. *P. flexilis.*—A small slow-growing tree near the last in many particulars, but having more flexible branches and a bushy habit. Leaves crowded, rigid, about 2 inches long. Cones from 4 to 5 inches long, with wedge-shaped scales. A native of California.

18. *P. lophospérma.*—This is very distinct in habit and foliage from all of the preceding species of this section. It is a handsome tree of large dimensions with rather loose branches and glossy yellowish green leaves from 7 to 10 inches long. Sheath large, persistent. Cones nearly globular, about 5 inches long, smooth and shining. This is a native of Lower California, and rather tender.

P. monticola and *P. Lambertiàna* are Californian species near *P. Strôbus;* and *P. parviflòra* and *P. Koraiénsis* are recently introduced Japanese species of this affinity.

In addition to the foregoing species of *Pinus*, we might have included some of the numerous Mexican species; but as they are all more or less tender, and the scope of our work limited, we have preferred to pass them by with this slight allusion.

2. ÀBIES (including *Pìcea* and *Tsùga*).

Evergreen trees or shrubs. Leaves needle-shaped or slightly flattened and linear, never clustered. Male cones or catkins axillary. Female cones terminal or lateral, pendulous or erect, with thin closely imbricated scales not thickened at the tip. Seeds usually winged. The species included under this head differ considerably in habit and foliage and position of the cones, and by some authors they are divided into three genera; but the long series of species now known exhibit every gradation of the supposed distinctive characters. Nevertheless, for broad distinctions of groups some of these features are useful.

Some authors go even farther and unite this with *Pìnus*, and include *Cèdrus*, *Làrix*, etc. The species are confined to the northern hemisphere, and especially abundant in the temperate, less common in the arctic and warmer regions. The derivation of the generic name is obscure.

§ 1. *Leaves needle-shaped or linear, scattered all around the shoots. Cones pendulous when mature.*—ABIES *and* TSÙGA.

1. *A. excélsa* (fig. 217). Norway Spruce or Spruce Fir.—This handsome hardy evergreen tree is unsurpassed in the rich warm hue of its dense dark green foliage and the regularity of its pyramidal or conical outline. It is as familiar as our commonest native trees, and therefore we are justified in passing it by without description. There are numerous varieties, a few of which are very remarkable and worthy of a place in even a small collection. The most curious and interesting are as follows:—*Clanbrasiliàna*, a dwarf slow-growing spreading densely-branched shrub with short closely-packed leaves, never exceeding 3 or 4 feet in height; *pýgmæa*, or *nàna*, is a still more diminutive form, about a foot high; *péndula* has graceful drooping branches; *invérta* has pendulous branches and larger foliage than the type; *monstròsa* has very stout branches and large foliage; *pyramidàlis* is a slow-growing dwarf variety of conical shape; and *horizontàlis* is of irregular dwarf habit with long trailing branches. We have by no means exhausted the list of varie-



Fig. 217. Abies excelsa.

ties, but this enumeration will be sufficient for all but collectors. The Common Spruce is found in the mountain valleys of Central and the plains of Northern Europe and Asia.

2. *A. álba.* White Spruce.—A handsome compact-growing small tree 50 to 70 feet high, resembling the Common Spruce, but with shorter thicker less sharply pointed pale glaucous green leaves, and small cylindrical cones from 1 to 2 inches long. Scales of the cone entire. A native of Canada and other parts of North America. The variety *minima* is an extremely diminutive plant of globular form. It is the *echinofórmis* of French gardens. The varieties *glàuca* and *cærùlea* differ merely in the tint of the foliage.

3. *A. nìgra.* Black Spruce.—This species has the small cones of the last species, but the scales are irregularly toothed at the margin. The foliage too is of a deep dark green colour. Neither this nor the last equal the Common Spruce as an ornamental tree, for they both lose their beauty as they grow old. *A. rùbra*, Red Spruce, is a variety of this with redder bark and cones. Both occur in the northern parts of North America.

A. obovàta and *A. orientàlis* are two closely allied species or forms of one species, the former from Siberia, and the latter from the countries bordering the Black Sea. They are remarkable for their compact habit and small slender foliage, and loose cones from 2 to 3 inches long. The latter is sometimes found under the alias of *Wittmaniàna* and is a slow-growing handsome tree.

4. *A. Menzièsii.*—This is a tree from 50 to 70 feet or more high with very rigid slender divergent crowded mucronate leaves about an inch long, bright green above, glaucous beneath. Cones about 3 or 4 inches long. Scales thin, oblong, toothed. A very hardy species, not so ornamental as some others on account of the early loss of its leaves. Northern California.

5. *A. Smithiàna*, syn. *A. Morínda.*—A large tree with graceful drooping branches densely clothed with rigid sharply mucronate bright green leaves from 1½ to 2 inches long. Cones from 4 to 6 inches long, with broad entire rather thick shining brown scales. This is a native of the mountains of Northern India, China, and Japan. Unlike many of its class, this tree increases in beauty with size, and on the same soil and in the same situation it gradually assumes a beautiful form from the

most wretched-looking specimens. This is due to its being Spring-tender as a small plant.

There are several Japanese species of somewhat recent introduction we may mention here: *A. firma*, *A. microspérma*, *A. Alcoquiàna*, and *A. Jezoénsis*. The hardiness of some of these species has not yet been proved.

6. *A. Douglásii.*—This is a magnificent and very lofty tree in its native habitat, where it occasionally attains a height of 300 feet. Leaves flexible, spreading, in two ranks, flat, linear, scarcely pointed, bright glossy green above, and more or less glaucous beneath, from 1 to 1½ inches long. Cones about 3 inches long, with broad rounded scales and conspicuous projecting deeply-toothed bracteoles. A native of North-western America, introduced about the year 1826. Unfortunately, this beautiful ornamental tree, though perfectly hardy, will not flourish in an exposed situation, or the immediate vicinity of the sea. It is a fast-growing species, with somewhat pendent symmetrically disposed branches and reddish brown shining bark. The variety *taxifòlia* is of smaller growth, with longer darker green leaves; and *Standishiàna* has large glossy dark green leaves distinctly silvery below.

7. *A. Canadénsis.* Hemlock Spruce.—This is a very distinct species and very beautiful as a small tree. In its native country it grows from 50 to 80 feet high, with slender pendulous branches. Leaves linear, flat, obtuse, about 6 lines long, dark green above, silvery beneath. Cones less than an inch long, with oblong rounded entire scales. An extremely elegant hardy evergreen, flourishing well in damp situations. North America.

8. *A. Albertiàna*, syn. *A. Williamsònii* and *A. Mertensiàna* of gardens.—This is very like the last, and is often confounded with it; but the leaves are shorter, slenderer, and the branches hairy. The true *Mertensiàna* is said to be distinct, but we do not know it, though *A. Hookeriàna* bears that name in some gardens.

A. Brunoniàna from North India, and *A. Tsùga* from Japan, are allied species.

9. *A. Hookeriàna*, syn. *A. Pattoniàna* of gardens.—A very distinct tree of large size. In a young state it has somewhat the habit of a Juniper, the leaves being linear, mucronate and erect, of a pale slightly glaucous tint. It is a very hardy species, forming an erect dense much-branched shrub.

§ 2. *Leaves linear, flat, or lenticular, in two rows or ranks, more rarely scattered. Mature cones erect.*—PICEA.

* *Species with the bracts of the cones longer than the scales.*

10. *A. pectinàta.* Common Silver Fir.—A handsome tree from 100 to 150 feet high. Young branches clothed with blackish short hairs. Leaves about an inch long, linear, flat, obtuse, glossy, yellowish-green above, with 2 silvery lines beneath. Cones about 6 inches long, cylindrical, brown when ripe. Scales broad, thin and rounded. Seeds winged. This species is seldom seen in its greatest beauty as a small plant, on account of the spring frosts injuring the young shoots; but after it has attained the height of a few feet, it does not appear to start into growth so early, and thus escapes the effects of the cold. It is a native of Central Europe, and is well adapted for cold soils or exposed situations. There is a variety called *péndula*, of little merit; a dwarf form, *nàna*; an erect variety, *fastigiàta*; and several others scarcely worthy of notice.

11. *A. Cephalónica.*—This is another splendid species, agreeing in habit and disposition of the foliage with *A. Pinsàpo*, but here the leaves are rather longer, less crowded, thinner, and tapering to a very sharp point, glossy dark green above and glaucous beneath. The cones too are longer, and the bracts exceed the scales. A native of Greece and Cephalonia.

A. Apollìnis, a native of the mountains of Greece, is a closely allied species or form, intermediate in character between the last and the Silver Fir. It is said to be equally handsome, but, like both of its relatives, suffers greatly from late Spring frosts. It also bears the name of *A. Reginæ Amàliæ.*

12. *A. balsàmea.* Balsam or Balm of Gilead Fir.—This is a small tree resembling the Silver Fir, but, although hardier than that, less desirable on account of its liability to disease and early decay. It is also less robust, with smaller fóliage, and cones from 3 to 4 inches long. A native of North America. *A. Fràseri* is a closely allied small tree with smaller leaves, and cones from 1 to 2 inches long; and *A. Hudsònica* is a diminutive form of the latter.

13. *A. nóbilis.*—This is one of the most striking and majestic species of this order, whether as a small specimen or a large tree. In its native country, so rich in magnificent large trees, it is said to form a most imposing sight, not only for its

gigantic stature, but also in regard to its symmetrical growth, rich deep green incurved foliage, and large erect cones. In young trees the rigid crowded spreading incurved leaves are linear, lenticular, rather thick, about 1½ inch long, obtuse or slightly pointed, of a glaucous bluish green on both sides at first, ultimately assuming a darker hue. Cones sessile, 6 to 9 inches long, with large reflexed acuminate bracts, and large broad and entire scales. This was discovered and introduced by Douglas. It is a native of Northern California, and appears to be perfectly hardy in this country, where there are already many handsome specimens of considerable size.

14. *A. Nordmanniàna.*—A magnificent tree, contrasting well with the last. It grows from 80 to 100 feet high, and is of quite regular growth, but the branches are less stiff and formal, and the foliage is of a dark very glossy green above and silvery beneath. Leaves on young trees spreading in two ranks, with a half-twist at the base, about an inch long, rigid, linear, flat, and minutely bifid at the apex. Cones pedunculate, 4 to 6 inches long, with cordate-acuminate recurved bracts and large entire scales. This beautiful hardy tree is a native of the Crimea and other countries bordering the Black Sea.

15. *A. bracteàta.*—A tall slender tree with rigid linear flat distichous leaves from 2 to 3 inches long, bright glossy green above, and glaucous beneath. Cones about 4 inches long, remarkable for the large coriaceous 3-lobed and fringed bracts which greatly exceed the scales. Unfortunately this handsome species starts into growth so early in Spring that the young shoots are almost invariably injured by the late frosts, and therefore, as we have so great a choice, this should be rejected. It is a native of California.

A. religiòsa is a handsome though tender Mexican species.

* * *Species in which the bracts do not exceed the scales of the cones.*

16. *A. Pinsàpo.*—A most magnificent species in the regularity and symmetry of its habit, attaining a height of 50 to 70 feet. The branches are dense and rigid, and very densely clothed with thick linear lenticular mucronate leaves enlarged at the base, from 6 to 10 lines long, and regularly disposed all around the branches, and at right angles with them. The foliage is of a yellowish green hue, with glaucous stripes. Cones sessile, oval or oblong, 4 to 5 inches long; scales broad,

rounded; bracts short. This beautiful tree is quite hardy, and on account of its compact growth and unique appearance it is worthy of a place in every garden. It is a native of the mountains of Spain. The var. *variegàta* is not desirable.

A. Webbiàna and *A. Pindrow* are both very fine species, with long distichous flexible leaves, and large purple cones, from North India, but they are too tender for our climate.

17. *A. Cilícica*, syn. *A. leiocàrpa* and *A. cándicans*.—A small tree with greyish furrowed bark, and foliage like the Silver Fir, but the young shoots are not hairy. Leaves 1 to 1½ inch long, linear, flat, crowded, in two ranks, dark green above, and glaucous beneath. Cones cylindrical, 6 to 8 inches long, with broad thin entire coriaceous scales. A native of Asia Minor, and apparently perfectly hardy.

18. *A. Pichta*, syn. *A. Sibírica*.—A small tree from 30 to 40 feet high, with short linear flat obtuse leaves, dark green above, paler beneath, and cones about 3 inches long. A native of the mountains of Siberia, rather liable to suffer from Spring frosts in this country.

19. *A. grándis*.—A handsome large tree from 100 to 250 feet high, of symmetrical habit. Young branches glabrous. Leaves distichous, of unequal length, varying from 6 lines to 1½ inch, linear flat emarginate glossy dark or yellowish green above, and silvery beneath. Cones from 3 to 4 inches long, with broad entire scales. This is a very desirable ornamental tree of rapid growth and perfect hardiness. A native of Upper California.

20. *A. Parsónsii*, syn. *A. Lowiàna* and *A. lasiocàrpa* of gardens. A very beautiful and distinct species, with yellow bark on the young branches, and linear flat obtuse glaucous green leaves, channelled above, from 2 to 3 inches long, and 2 to 3 lines broad. Cones cylindrical, from 3 to 5 inches long. In its native country this splendid *Abies* is said to attain a height of upwards of 250 feet. In the small specimens we have seen, the somewhat rigid branches are regularly disposed in distant whorls. It differs essentially in its larger distichous foliage from all others we know. Besides the names above given, it frequently bears the false one of *grándis*, from which it is so distinct as to set aside all possibility of confusion. A native of California, and perfectly hardy in the South of England.

21. *A. amábilis*.—This magnificent Conifer is comparatively rare, in consequence of the necessity of raising it by grafting;

and many of the specimens bearing this name in gardens are not the true plant. Leaves scattered, crowded, 1½ to 2 inches long, linear obtuse dark green above, silvery beneath. The cones are described as cylindrical, and about 6 inches long. A native of North California, introduced by Douglas in 1831, and one of the handsomest of the genus.

22. *A. Veîtchii.*—A somewhat recently introduced Japanese species. It is described as a handsome distinct tree from 120 to 140 feet high. Leaves crowded, incurved, 6 to 12 lines long, linear, flat, glaucous above, silvery beneath. Cones from 2 to 2½ inches long, with broad rounded scales. This species is still rare, and we have no experience of its hardiness, but the elevation of its native habitat—6,000 to 7,000 feet—would lead us to suppose it to be quite hardy.

A. magnífica is unknown to us as a cultivated plant, though we remember seeing the name quoted somewhere.

3. LÀRIX.

Deciduous trees with needle-shaped, scattered, and fascicled leaves, lateral male catkins, and small erect cones with thin persistent scales. About eight or ten species are known, found in Europe, Asia and North America. The name was applied by the ancients to the European species.

1. *L. Europæa.* Common Larch.—This species is now so extensively planted for use as well as ornament, that in many districts it forms a conspicuous feature of woodland scenery. In Spring, when it puts forth its bright green foliage, it is highly attractive, but it soon assumes a more sombre tint, and should therefore be sparingly planted for ornamental purposes. Some of the varieties are worth noticing, especially *péndula*, a form with slender drooping branches; and *glaùca*, with decidedly glaucous foliage.

There are several other species in cultivation, but all of them are rare, and likely to continue so; for none of them surpass, or perhaps even equal, the common species. *L. Americàna*, Black Larch, and *L. occidentàlis*, are American species. There is a variety of the former in gardens under the name *microcárpa*, from its very small cones. *L. Griffithiàna*, from Sikkim, is an irregularly branched tree whose foliage changes to a bright red towards Autumn, and whose cones are double the size of those of the common Larch. *L. Dahùrica* and *L. Ledeboùrii* are Siberian species with extremely small cones;

and *L. leptolèpis* is a Japanese species, remarkable for the very numerous thin reflexed scales of the small cones.

Pseudolàrix Kæmpfèri, a deciduous tree with clustered needle-shaped yellowish-green leaves and small cones having loose woody deciduous scales, is a native of China, very rare and scarcely hardy in this country.

4. CÈDRUS.

Noble evergreen trees with rigid scattered and clustered leaves and erect oblong or oval cones rounded at the top. Scales of the cones broad, thin, coriaceous, entire, closely appressed, at length deciduous. Seeds winged. The species or forms are natives of the Atlas, Syrian and North Indian mountains. Dr. Hooker, who has had opportunities of observing them in their native countries, pronounces them to be forms or races of one species, whilst other accomplished botanists consider them entitled to specific rank. Whichever view we take of the matter is of little importance, because they are sufficiently distinct in the young state at least to be easily recognised. The ancient name of the Syrian tree.



Fig. 218. Cedrus Libani.

1. *C. Libàni.* Cedar of Lebanon (fig. 218).—A majestic branching tree with short rigid deep dark green leaves and oblong oval pedunculate purplish ultimately brown cones from 3 to 4 inches long, remaining on the tree several years. Scales with a somewhat membranous margin, separating tardily from the axis. This species was introduced nearly two centuries ago, and there are now many hundreds of fine specimens in various parts of the country. It is perfectly hardy, producing its cones and ripening its seeds as freely as in

its native habitats, where, by-the-by, it is gradually becoming very rare. It has been found on Mounts Lebanon, Taurus and Aman. There is a diminutive form called *nàna*, and the variety *argéntea* has silvery foliage.

2. *C. Atlántica*, syn. *C. Africàna* and *C. argéntea*. African or Silver Cedar.—It is difficult to find distinctive characters for this and the foregoing, but the main difference lies in the foliage, which in this is shorter, usually less than an inch in length, and of a glaucous green or silvery hue. It is a large tree, from 80 to 120 feet high, of more erect pyramidal habit than that commonly assumed by the Lebanon Cedar in this country, rarely producing thick branches like the latter. It forms almost exclusively the arborescent vegetation of the upper plateaus of the Atlas mountains. It has been stated by M. Jamin that this and the foregoing are associated at Fougour, and that the Silver Cedar ripens its cones earlier than *C. Libàni*. But this will be accepted with considerable doubt when we remember that the cones are two or three years coming to maturity, and that the same tree does not produce cones every season.

3. *C. Deodàra*. Deodar or Indian Cedar.—A pyramidal tree when young, with dense slender drooping branches thickly clothed with glaucous green leaves. In the young stage the Deodar is readily distinguished by the foregoing characters added to the longer leaves; but according as the tree becomes older, these distinctions are less apparent, though perhaps never entirely obliterated. The cone of this form is said to shed its scales as soon as mature. This is undoubtedly one of the most elegant and graceful members of this beautiful order, and is now planted by hundreds of thousands. There are two or three rather striking varieties. *C. D. robústa* has coarser larger leaves and thicker branches; *C. D. crassifòlia* has short thick rigid foliage; and *C. D. víridis* or *tenuifòlia* is of slender habit, with bright green foliage. This species is a native of the mountains of North India, where it forms vast forests up to an elevation of 12,000 feet. It attains a height of 100 to 150 feet, with a girth of 20 to 30 feet. It was introduced into England in 1822.

Cunninghàmia Sinénsis, the only known species of its genus, is a lofty evergreen tree with sessile lanceolate-acuminate coriaceous leaves, somewhat in the way of an *Araucària*. Cones rather small, ovate, remarkable in having small almost

obsolete scales, and large leafy toothed bracts. A native of China, and too tender for any but the most favourable localities in this country.

Arthrotáxis is a small genus of Australasian evergreen diœcious shrubs with small scale-like leaves and small globular cones of imbricated scales with from 3 to 5 carpels under each scale. None of the species are hardy enough to withstand our ordinary winters.

5. SCIADÓPITYS.

So far as at present known, this is a monotypic genus. Leaves linear, whorled. Male cones small, sessile, terminal. Female cones ultimately pedunculate; scales broad, rounded, entire, coriaceous, persistent; bract short, broad. Seeds winged, 7 to 9 under each scale. The name is a compound of σκιάς άδος a parasol, and πίτυς, a Pine-tree, in allusion to the disposition of the leaves resembling the framework of an umbrella.

1. *S. verticillàta.* Umbrella Pine.—A large evergreen tree from 50 to 150 feet high, according to situation. Leaves from 2 to 4 inches long, and about 2 lines broad, linear, obtuse, glabrous, from 20 to 40 in each whorl. Cones solitary, from 2 to 3 inches long. This singular and beautiful tree is a native of Japan, and quite hardy in this country. It was introduced into Europe in 1861.

6. ARAUCÀRIA.

Diœcious or sub-diœcious evergreen trees with usually imbricated persistent flat sessile scale-like leaves. Male cones large, cylindrical, terminal. Female cones very large, globular, terminal, with dense ligneous deciduous scales, each bearing a solitary seed. A genus of few species found in South America and Australasia. The generic name is from Araucanos, the name of a tribe of people in Chili whose principal article of diet is furnished by the large nuts of *A. imbricàta.*

1. *A. imbricàta.* Chili Pine.—This is a most majestic tree, from 100 to 150 feet high, of pyramidal or conical outline. Branches rigid, horizontal or slightly depressed, arranged in symmetrical whorls, and densely clothed with large flat sessile sharp-pointed glossy green leaves, which perish only with the tree. Cones from 6 to 9 inches broad and long. Seeds oblong or cuneate, 1 to 2 inches long, scarcely winged. This

tree is so distinct in habit and foliage as to preclude the possibility of its being confounded with any other hardy species in this country. *A. Braziliàna* and *A. Bidwillii* are allied tender species. The former is from South America, and will just exist in one or two localities in England. The other is an Australian tree. The Chili Pine is quite hardy only on well drained soils. It was introduced in 1796 by Menzies, and there are now many magnificent large specimens in various parts of this country. Of the original specimens that at Dropmore is the finest and largest, not a branch being wanted to complete its symmetry.



Fig. 219. Araucaria excelsa.

There is a group of Australasian species differing in their smaller narrower foliage, and more flexible branches. *A. excélsa*, the Norfolk Island Pine (fig. 219), is one of the handsomest, but though too tender for the open air in this country, it may frequently be seen in conservatories or out of doors in Summer. In its native country it often exceeds 200 feet in height.

7. SEQŬOIA.

Gigantic evergreen trees with linear distichous or needle-shaped or scale-shaped and imbricated leaves and small solitary terminal cones. Flowers monœcious; males in globular stalked catkins. Scales of the cones woody and persistent. Seeds small winged, from 3 to 5 under each scale. There are but two species described, both of which are in cultivation. The derivation of the generic name is obscure, but it has been suggested

that it is a modification of *See-qua-yah*, the name of a celebrated Cherokee chief.

1. *S. gigántea*, syn. *Wellingtònia gigántea*, *Washingtònia gigántea*, etc. Mammoth Tree.—A colossal tree with dense slender branches thickly clothed with small leaves at first needle-shaped and spreading, at length scale-like and closely imbricated and appressed, of a bright light green. Cone about 2 inches long, oblong; scales woody, persistent, wedge-shaped. This marvellous tree exceeds all others in its gigantic proportions, not excepting the enormous Gum-trees of Australia and Tasmania. One that was felled and stripped of its bark measured 327 feet in height, and 90 feet in circumference at the base; and another was discovered broken off at a height of 300 feet, where it was 18 feet in diameter, hence it is contended it must have been about 450 feet high altogether. It measured 112 feet in girth at the base. It is a native of various parts of the Sierra Nevada in Upper California, where it was first discovered, it is reported, by an American hunting party in 1850. But the English collector, Lobb, appears to have been the first to introduce it into our gardens during the year 1853. It is also stated that Douglas saw it as early as 1831. However that may be, we may now count it by hundreds of thousands in this country, and some specimens have already attained a height of nearly 40 feet. Although this noble tree is generally known in this country by the name of *Wellingtònia gigántea*, we must remind our readers that from a scientific point of view this name is untenable, and must give way to that adopted by us, and now admitted by most botanical writers. Doubtless the tree will retain Wellingtonia as its popular name, in the same way as we call *Pelargoniums* Geraniums in common parlance.

2. *S. sempervìrens*, syn. *Taxòdium sempervìrens*. Redwood.—This also is a very lofty tree, towering to the amazing height of 200 to 300 feet. It was first discovered by Menzies in 1796, and until the species just described became known, it was justly considered as the 'Giant of the Forest.' Branches numerous, slender. Leaves distichous, linear, flat, acute, soft flexible, from 6 to 9 lines long, dark glossy green above, and silvery beneath. Cones about an inch long, nearly spherical, with thick woody scales terminating in a hard point. This species is scarcely so hardy as the Wellingtonia, but it will

thrive well on well-drained soil, and grow at an extraordinarily rapid rate. A native of California.

Dámmara is the last genus of this tribe, but all the species are tender. They are large dicœcious trees with flat coriaceous leaves, and oblong or spherical densely imbricated cones with a solitary seed at the base of each scale. *D. austràlis* is the Kauri Pine of New Zealand.

Tribe II.—*CUPRESSÌNEÆ.*

Fertile flowers in small cones or strobiles consisting of a few bracts and no scales. Ovules and seeds erect, one or more at the base of each scale.

8. JUNÍPERUS.

Evergreen trees or shrubs, often with two kinds of leaves, and usually dicœcious flowers. Leaves needle-shaped, linear or lanceolate, rigid or flexible, scattered or imbricated, not clustered. Male flowers in small axillary clustered aments. Fruit small, berry-like, composed of a few closely appressed at length fleshy scales with 1 or more seeds at the base of each scale. This genus is very numerous in species and forms which are very difficult of discrimination, and it is almost impossible to determine them from the most carefully framed descriptions, much less from the short notes we are able to afford space for. But those who are familiar with some of the species may glean from our comparative characters what the others are like. The species are all natives of temperate and cold regions, mainly in the north. The classical name for the common species.

1. *J. Chinénsis.*—This is a very handsome dicœcious shrub. The male and female plants are of distinct habit and aspect, the former being the handsomer of the two. Leaves ternate or opposite, linear, flat, acute and spreading, or small, scale-like and closely imbricated. On young plants and in the males they are nearly all of the first sort. The male plant is more universally cultivated than the female. It is a dense much-branched shrub with dark green foliage and somewhat drooping branches. The flowers are produced in great abundance in early Spring. The male plant bears the alias of *J. flagelliformis*, and has long pendulous branches of a glaucous hue. Native of China and Japan, and quite hardy.

2. *J. Japónica*, syn. *J. procúmbens.*—A dwarf dense bushy

evergreen, very similar to the last in foliage, which is however of a bright lively green. A desirable hardy shrub from China and Japan.

3. *J. communis.* Common Juniper.—This is the only indigenous species, and one of wide distribution, occurring throughout Europe, North Africa, North Asia, and northern parts of North America, in a great variety of forms, from a tree 50 feet high to a creeping bush not more than a foot high. The leaves are subulate, rigid, sharp-pointed, spreading, and opposite or in threes, usually glaucous above and green below. There are several distinct varieties in cultivation, among which we may mention :—*alpina*, syn. *Canadénsis* and *depréssa*, of trailing or ascending habit and glaucous foliage ; *Hibérnica*, Irish Juniper, a distinct variety of erect dense conical outline and silvery foliage ; *Hibérnica variegàta*, the same as the last with prettily variegated leaves ; *Suècica*, Swedish Juniper, a more erect-growing form than the type, with longer more distant leaves of a yellowish-green tint ; and *péndula*, with slender somewhat drooping branches of a reddish colour, contrasting well with the glaucous green foliage. *J. compréssa* is a sub-variety of the Irish Juniper, of dwarfer denser habit, with slender branches and smaller leaves.

4. *J. Virginiàna.* Red Cedar.—A shrub or small tree occasionally attaining a height of 30 feet or more. Leaves on young plants and some parts of the older subulate and spreading ; on older, nearly all very minute, scale-like and closely imbricated. Fruit very small, of a bluish glaucous tinge. This is an extremely variable species both in size, habit and foliage, and some of the forms rank amongst the hardiest and most ornamental of the genus. From the great disparity in the proportion of scale-like leaves and subulate leaves in different individuals, as well as the more or less distinct habit, it is difficult to find two plants exactly alike, even in a large plantation. The prevailing hue is dark sombre green, but in the variety *glaùca*, syn. *álba argéntea* and *cinerásccns*, the foliage is of a silvery glaucous tinge. The compact conical habit of this variety combined with its silvery foliage renders it very distinct and desirable. *J. V. hùmilis* is a dwarf spreading form with foliage of a reddish tinge. *J. V. péndula*, of which there are two or three varieties, has long slender pendulous branches. The variety called *péndula víridis* is the best. In addition to the above we may mention the variegated varieties

aùrea and *álba* of the ordinary form. The Red Cedar is a native of the greater part of the United States.

5. *J. thurífera.* Frankincense Juniper.—A very ornamental pyramidal tree from 30 to 40 feet high in its native country. Branches slender, numerous, densely clothed with subulate imbricated leaves of a light glaucous green. Fruit large, ovate, dark-coloured, covered with a glaucous bloom. A native of the mountains of Spain and Portugal, and quite hardy in this country.

6. *J. squamàta*, syn. *J. dumòsa.* Creeping Cedar. — A trailing or drooping densely branched shrub. Branches rather thick. Leaves of a light glaucous green, crowded, linear-subulate, convex below, appressed, persistent, and changing to brown the older branches. This is a very distinct and curious species, native of the mountains of Northern India at a great elevation.

7. *J. Sabìna.* Savin.—A dwarf spreading shrub with numerous reclinate or trailing branches. Leaves small, scale-like, acute, slightly spreading, of a deep dark green colour. Fruit small, purplish, spherical, usually 1-seeded. This shrub was formerly much more extensively cultivated than it is at the present day. Nevertheless a well-grown healthy specimen is by no means devoid of beauty and quite unique in the tabular form it assumes. The variety *cupressifòlia* is said to be perfectly distinct in its slenderer branches and glaucous silvery foliage. *J. tamariscifòlia*, syn. *J. Sabinioìdes*, is also a variety; and there is a prettily variegated variety. This species inhabits the mountains of Central and Southern Europe, and also occurs in Canada and other parts of North America.

8. *J. prostràta*, syn. *J. rèpens.*—This is another trailing densely branched species with shining dark green loosely imbricated foliage and small purplish glaucous fruits. A native of North America, well adapted for covering rock-work, etc.

J. dénsa and *J. recúrva* are two handsome North Indian species of dwarf habit, but they, like many other species, are very liable to the attacks of the red spider, except in humid localities.

9. *J. excélsa* of Bieberstein, not of Madden.—In its native habitat this attains a height of 30 or 40 feet, forming a compact densely-branched tree. Leaves small, subulate, acute somewhat spreading, glaucous green. It is a native of the South-east of Europe and Western Asia, and rather tender in this country. *J. excélsa* of Madden is the *J. religiosa* of

Royle, a tree of considerable size, scarcely known in cultivation.

10. *J. fràgrans.*—An erect pyramidal shrub with very numerous exceedingly slender branches densely clothed with minute scale-like imbricated silvery-green leaves. In young plants and on scattered branches of older ones the leaves are subulate and spreading. This species emits an extremely powerful odour when bruised. It is said to be a native of Northern Europe by some, and by others it is reported to come from the Rocky Mountains in North America, that is to say, if both parties have the same species in view.

11. *J. Oxycèdrus.* Prickly Cedar.—A small loosely branched tree with linear-lanceolate very sharp-pointed light green leaves, and large shining red fruits. A native of the Mediterranean region.

J. macrocárpa, from the same region, is distinguished by its still larger purplish glaucous fruit about 8 or 9 lines in diameter. *J. drupàcea*, from Asia Minor, has the spreading leaves in six rows, and a fleshy fruit about an inch in diameter. *J. Bermudiàna* is a very beautiful though tender species with long linear spreading leaves of a light yellowish-green colour.

12. *J. Phœnícea.*—A small ornamental tree with loose drooping branches and small imbricated leaves of a light green colour. *J. Langoldiàna* is said to be the male plant of this species. The medium-sized fruit is described as pale yellow when ripe. A native of rocky districts on the shores of the Mediterranean Sea.

9. CÁLLITRIS.

Shrubby or small trees with long very slender jointed branches and often exceedingly minute scale-like persistent leaves. Flowers monœcious. Fruit globular, composed of 4 to 6 unequal woody valvate scales with one or two seeds at the base of each. There are several species, chiefly Australian. The generic name is derived from *καλός*, beautiful.

1. *C. quadriválvis.*—A tree of considerable size and irregular growth in its native country, Barbary, but remaining shrubby with us, and only hardy in the warmest parts of Britain and Ireland.

Widdringtònia is a South African genus of tender shrubs.

10. LIBOCÈDRUS.

Handsome evergreen trees with imbricated scale-like leaves and monœcious flowers. Fruit oval, consisting of 4 leathery or ligneous valvate unequal scales. Seeds winged, 1 or 2 at the base of each scale. Species few, from New Zealand and South-Western and North-Western America. The name is from *libanos*, incense, and *cedrus*, the cedar, in allusion to the odoriferous wood.

1. *L. decúrrens*, syn. *Thùja Craigiàna* or *Corrigiàna* and *Th. gigántea* of English gardens.—This is a very beautiful and distinct evergreen tree of compact erect habit, with a remarkably stout trunk. It is generally known under the latter name, but unless this genus be merged in *Thùja*, this is its proper position, on account of the difference in its fruit from that of the true Arbor-Vitæs. The branchlets are numerous, alternate, and plaited, or flattened laterally. Leaves bright rich glossy green, small linear and scale-like, quadrifariously imbricated, acute at the free apex, with long decurrent base, persistent and elongated on the older branches. The glandless decurrent leaves and columnar habit readily distinguish this from all its allies. Fruit ovate or oblong, erect, smooth. Scales furnished with a small recurved prickle just below the apex. A native of the Sierra Nevada Mountains of California, where it attains a height of 120 to 140 feet.

2. *L. Chilénsis.*—A handsome tree, growing 60 to 80 feet high in its native country. Branches compressed, spreading and pendulous. Leaves oblong-trigonous, appressed, obtuse, glaucous green. Fruit ovate, composed of four woody scales. This ornamental species is a native of the Andes of Chili, and rather tender in this country.

3. *L. tetrágona.*—This is also a South American species, extending from Valdivia to Magellan's Straits, and ranging according to locality from a dwarf bush to a lofty tree 120 feet or more in height. With us it is a shrub of compact pyramidal growth, with spreading depressed branches. Branchlets tetragonal, densely clothed with small ovate scale-like obtuse pale green leaves, imbricated in four rows. Fruit consisting of 6 coriaceous scales in three pairs. This is a somewhat hardier species than the last.

L. Doniàna is an exceedingly beautiful species from New Zealand, but it will not bear our Winters.

11. FITZRÓYA.

Evergreen trees with imbricated scale-like leaves. Flowers monœcious. Fruit small, consisting of 9 scales in three whorls, the upper and lower of which are barren, and the intermediate one has 2 or 3 winged seeds at the base of each scale. This genus was dedicated to Captain FitzRoy, who was the first to discover the following species.

1. *F. Patagònica.*—A large tree 100 feet high, or smaller, according to the elevation at which it grows. Branches slender, spreading, and incurved at the extremities. Leaves small, ovate-oblong, flat, obtuse, sessile, in 2, 3 or 4 rows. The only species hitherto described, native of the mountains of Patagonia, and not sufficiently hardy to withstand our coldest Winters.

12. THŬJA.

Evergreen trees or shrubs with compressed branchlets and imbricated often tuberculate scale-like leaves. Flowers monœcious. Fruit conoid, composed of overlapping scales affixed by the base, and destitute of recurved prickles. Seeds usually 2, with a marginal wing. As thus characterised, this genus is limited to the American species of Arbor Vitæ, though the Eastern species, or at least some of the forms, are usually known in gardens under the name of *Thùja*. The principal difference is in the scales of the fruit, which are shield-like and tubercled in *Biòta*, or the Chinese Arbor Vitæ. The generic name is from *θύον*, an odoriferous tree used for incense.

1. *Th. gigántea*, syn. *Th. Menzièsii*, and *Th. Lóbbii* of English gardens. This is a very ornamental fast-growing tree, attaining a great size in the valleys of the Rocky Mountains. Branchlets slender, flexible, and very numerous, compressed, covered with scale-like finely pointed leaves, which are of a very bright shining green on the upper side of the branches and glaucous on the lower side. Leaves destitute of tubercles, persistent and changing to brown on the older branches. Fruit almost exactly like that of the common American Arbor Vitæ. This is perfectly hardy and greatly exceeds the following species in elegance and gracefulness of habit.

There is so much confusion in the nomenclature of Conifers and many of them have so many synonyms, that we do not feel quite confident that we have adopted the correct name for the

species usually called *Thùja Lóbbii* in gardens. But there is no doubt that the plant bearing the name of *Thùja gigántea* in many collections is the true *Libocèdrus decúrrens*. The only matter for surprise is that these two wholly dissimilar shrubs should have been mistaken the one for the other.

2. *Th. occidéntalis*. American Arbor Vitæ.—In the low swampy districts of the Northern States of the Union and in Canada this forms a compact tree from 20 to 50 feet high, but with us it rarely exceeds the dimensions of a large shrub. The branchlets are crowded, compressed, and rather massive, and the small leaves quadrifariously imbricated. The leaves of the lateral ranks are destitute of tubercles, whilst those in the centre on the upper and lower surfaces of the branchlets are mostly furnished with a conspicuous tubercle immediately below the acute apex. The foliage of this is of a bright light green in Summer, but like nearly all of the Arbor Vitæs it changes to a rusty hue in Winter, hence it should be avoided where bright cheerful verdure is desirable at that season of the year. The fruit is small, with about six slightly coriaceous persistent bracts. This is one of those trees whose seeds produce an infinity of more or less distinct individuals, but these differences are so slight as to be unworthy of perpetuation. There are, however, several very distinct varieties or races which come true from seed, whilst others can only be preserved by non-sexual propagation. Amongst the most interesting we may enumerate the variety *Sibírica*, syn. *Wareàna*, *Tartárica*, etc. This is commonly called the Siberian Arbor Vitæ, though its native country is unknown. In fact, it is said to have been raised from seed in the nursery of a Mr. Weire at Coventry, but whence the seeds came is not stated. It forms a compact, conical, very densely branched bush, with rather smaller closer rather obtuse leaves in which the tubercles are less prominent. Besides the dwarfer, more bushy habit of this variety, we must not omit to mention that the foliage is of a darker green. In addition to the above names it has received about a dozen others, but it usually bears one of the three quoted. *Th. o. plicàta* is another well-known form remarkable for the twisted branchlets being in pairs, giving it a plaited appearance. There is a variety of this variegated with yellow and green. The variety *péndula* has drooping branches with tufts of branchlets at their extremities; *cristàta* is a similar form; *pùmila*, *mínima*, and *compácta* are dwarf bushes; *ericoìdes* is

remarkable on account of most of the leaves being linear and spreading, showing a tendency to develop two kinds of leaves in this genus, a common occurrence in Junipers. The variegated varieties have little to recommend them, though that called *Vervæneàna* is rather more distinct than some of them.

13. THUJÓPSIS.

Evergreen shrubs or trees with scale-like sickle shaped appressed imbricate leaves, monœcious flowers, and globular cones. Scales of the fruit woody, overlapping, with about 5 winged seeds at the base of each. A Japanese genus of recent introduction, including some of the most curious and beautiful members of this order. The name is from *Thuja* and ὄψις, resemblance. For *Th. boreàlis*, see *Cupréssus Nutkaénsis*.

1. *Th. dolabràta.*—This was the first species introduced, and as a small shrub it stands almost unrivalled in the rich verdure of its glossy hatchet-shaped leaves and peculiar growth. In Japan it is said to form a most splendid tree of large size, and from its apparent hardiness we may look for it to do well with us, though it is not of very rapid growth. The leaves are somewhat loosely imbricated and more or less silvery on the under surface or shady side. But it is perhaps the habit of this plant that constitutes its most striking feature. The main branches are few and rather loose and spreading, with numerous compressed pendulous branchlets, and it does not readily form a distinct leader, or rather the leader does not appear distinctly above the lateral branches. It appears to prefer a moist cool soil. There is a variety in which the foliage is prettily variegated with pale yellow, and another, called *nàna*, of very dwarf habit.

2. *Th. lætevìrens.*—A small shrub about 4 or 5 feet high, with slender foliage resembling that of a Lycopod. It is described as an exquisitely beautiful hardy shrub, but it is still very rare in this country except as a very small plant.

3. *Th. Standíshii.*—This approaches *Th. dolabràta*, and may be nothing more than a distinct variety of that species. The branches are more pendulous in this, and the foliage smaller, glaucous, not silvery beneath.

These are probably garden varieties of *Th. dolabràta*, but they are sufficiently distinct to be desirable.

14. BIOTA.

This genus was separated from *Thùja* on account of a rather slight difference in the form of the fruit, which is composed of about 6 scales in opposite pairs, with a hook or tubercle near the apex, and 2 wingless seeds at the base. The scales are somewhat fleshy at first, but ultimately become more or less coriaceous or woody. This genus is, so far as at present known, limited to a single species, which is, however, almost endless in its forms. The name is probably a modification of *βιότος*, life, signifying the same as its trivial name, Tree of Life, or Arbor Vitæ.

1. *B. orientàlis*, syn. *Thùja orientàlis.* Chinese Arbor Vitæ.—A small compact densely-branched tree, from 15 to 20 feet high, with compressed crowded branchlets. Leaves bright green, very small, and closely imbricated, with slight depression or channel above, destitute of tubercles. The typical form of this species is a handsome shrub, preferable to the other Arbor Vitæs in some respects, especially for its brighter green foliage and less powerful odour, and some of its numerous varieties may be numbered amongst the most ornamental of evergreens, requiring little space for their full development. There is scarcely any appreciable difference in the foliage of most of these forms, except that in some there is a tendency to produce linear spreading leaves. This is more particularly the case in the variety *Meldénsis*, syn. *hŷbrida*, which has decurrent glaucous linear acute spreading leaves, and the fruits of the ordinary shape. This was raised from seed in a garden at Meaux, amongst a lot of the ordinary form, and at first supposed to be a hybrid between the Red Cedar and the Chinese Arbor Vitæ, but subsequent investigation has proved it to be a variety of the latter. It is more curious than beautiful, as it rarely forms a good specimen. Another very distinct and remarkable variety is that named *filifórmis*, syn. *flagellifórmis*, *péndula*, etc. This has long pendulous flexible whip-like branchlets, and longer though appressed acute leaves. A very beautiful and desirable shrub for sheltered localities on well drained soil where alone it will flourish satisfactorily. The Golden Cypress, *B. orientàlis aùrea*, is one of the most familiar of the compact-growing varieties, being nearly spherical in outline, with the young foliage of a bright yellow tinge. This is very pretty when the yellowness is not too highly developed, for in that

case it often happens that the foliage is too delicate to withstand the effect of the direct rays of the sun. *B. orientàlis*, var. *elegantíssima*, is an upright somewhat loose-growing form with the young foliage prettily variegated with yellow and green. *B. o.* var. *Sieboldii*, syn. *B. Japónica* is a very hardy and ornamental compact conical shrub, retaining its pleasing bright verdure throughout the winter. The variety *glaùca* is of rather irregular growth, with reddish-brown bark and dark green and glaucous foliage. It is said to be tender, but we have not observed that it has been affected by the cold. *B. Tartárica* is a distinct and very hardy form of dense erect habit with dark green shining foliage, and *B. pyramidàlis* is still narrower in outline. These two are sometimes considered as slight variations of a species distinct from *B. orientàlis*, but the intermediate gradations will not admit of that view. *B. o. pýgmæa* is a very dwarf slow-growing kind with glaucous foliage, and *B. o. compácta* is also exceedingly small in stature with very slender branchlets and bright green foliage. We might go on enumerating varieties, but the above include all that is best of the genus, and collectors will necessarily have a more complete guide than this work. We may add the following names for the purpose of showing their place. *B. monstròsa*, *macrocárpa*, *grácilis*, syn. *B. Nepalénsis*, *falcàta* and *argéntea*. This species is a native of India, China, and Japan, and many of the most marked varieties have been imported direct from the two latter countries.

15. CUPRÉSSUS (including *Chamæcýparis* in part).

Evergreen shrubs or trees with minute scale-like imbricate or linear-acute spreading leaves and monœcious flowers. Fruit globular, composed of peltate ligneous persistent scales separating at maturity to free the usually numerous slightly-winged seeds. Species numerous, occurring in Asia from the Black Sea, through the mountains of India to China, and in North America. The classical name of the Upright Cypress. We must limit ourselves to descriptions of the hardier species, and append a list of the tenderer sorts that will only succeed in Britain in a few favoured spots.

1. *C. Lawsoniàna.*—A highly ornamental tree from 80 to 100 feet high with elegant drooping branches and very slender flexible crowded feathery branchlets. Leaves dark glossy green, more or less tinged with a glaucous hue, very minute and

closely imbricated, obtuse, or acute usually furnished with an obscure tubercle towards the apex. Fruit small; scales with a small straight central prickle. This is one of the most invariable evergreens in trifling details of habit and in hue of foliage, and a few striking varieties have been preserved. One raised by Mr. Anthony Waterer, of Knaphill, and named *erécta víridis*, is very distinct in its erect habit and deep green foliage. The variegated varieties *aùrea* and *argéntea* are not so desirable as many other variegated shrubs. The names *compácta*, *láxa*, *grácilis*, *stricta*, *nívea*, *mínima*, and *intermèdia* designate some of the varieties distinguished by nurserymen, and sufficiently explain their individual peculiarities. This magnificent and extremely hardy evergreen is a native of Upper California.

C. frágrans, syn. *C. aromática* and *C. Califórnica*, is a closely allied species from the same region. It is a lofty slender tree with feathery branches and angular narrow acute light glaucous green leaves.

2. *C. macrocárpa*.—A tree of medium size with numerous stout spreading branches forming a flat top, and very dark green closely imbricated foliage. Fruit large. This is undoubtedly one of the most splendid ornamental trees we have, but, although perfectly hardy in exposed places, it will not succeed well in a low humid situation. This is probably owing in a great measure to its extremely rapid and late growth, and consequent imperfectly ripened wood. *C. Lambertiàna* scarcely differs even to the extent of a variety except in having pendulous branches when young. Upper California.

3 *C. Nutkaénsis*, syn. *Thuiópsis boreàlis*.—This fine species is better known in gardens under the latter appellation. It is a fast-growing tree from 80 to 100 feet high with numerous branches and drooping branchlets densely clothed with small closely imbricated very acute leaves destitute of tubercles, of a rich dark green, slightly glaucous on the lower surface or shady side of the branches. A very hardy and desirable evergreen, from North-western America.

4. *C. thyoìdes*, syn. *Chamæcýparis sphæroìdea*. White Cedar.—A tree from 30 to 60 feet or more high. Branchlets slender, not plaited. Leaves very minute, closely imbricated, furnished with a small tubercle about the centre, light green, soon falling from the older branchlets. There are several varieties, and the one called *variegàta* is very handsome, with

golden yellow and green foliage. The var. *glaùca* or *Kewênsis* is distinguished by the distinct glaucous hue of its foliage.

5. *C. sempervìrens.*—This is the species so commonly planted in the South of Europe and Asia Minor, especially the variety *fastigiàta*, or Upright Cypress (fig. 220), which is found in some places above a hundred feet high, with closely appressed branches like a Lombardy Poplar. Another variety, *horizontàlis*, has spreading branches, forming a flat-topped tree.



Fig. 220. Cupressus sempervirens var. fastigiata.

This is scarcely hardy in Britain, though it will succeed tolerably well in some places where the soil is free and porous and not rich enough to induce luxuriant growth. But a handsome specimen is rarely seen. It is supposed to be indigenous in Asia Minor and Persia.

6. *C. Macnabiàna*, syn. *C. glandulòsa.*—A densely branched shrub of pyramidal outline, growing about 10 feet high in its native country. With us it forms a dense dwarf glaucous bush. A native of California.

Amongst the tenderer species occasionally seen are: *C. funébris* and *C. Corneyàna* from China; *C. excélsa*, *C. Goveniàna*, *C. Knightiàna*, and *C. Uhdeàna* from Mexico; and *C. torulòsa* and *C. Lusitánica* from India. The latter is known as the Cedar of Goa, and was formerly extensively planted in Spain and Portugal, where it now appears in a semi-wild state; hence the specific name.

16. RETINÒSPORA.

This genus is so near the last that it might well be included in it, but this is not the place to introduce any changes in the nomenclature of plants, and possibly this may be as good a genus as many others. The principal distinction resides in the seeds, which are covered with resinous vesicles, giving rise to the generic name, from ῥητίνη, resin, and σπορὰ, seed.

These shrubs are included under the genus *Chamæcýparis* by some writers. Some of the forms described as species are probably not entitled to that rank. They are all from Japan.

1. *R. pisífera.*—A small tree with very slender feathery branchlets and scale-like very acute imbricate slightly spreading leaves of a yellowish-green tinge, glaucous beneath. Fruit very small, about as large as a medium pea. This is a very distinct shrub of somewhat irregular habit, and it appears to be quite hardy in the South of England. There is a variety *aùrea* with gold and green variegated foliage, and a variety *argéntea* with silvery foliage.

2. *R. obtùsa.*—A very beautiful species, forming a tree of 60 to 100 feet in Japan. Young plants of it are densely branched shrubs with closely imbricated decurrent obtuse tubercled leaves of a deep vivid green, silvery below or in shady places. Fruit larger than in the last. A very desirable hardy shrub. *R. lycopodioìdes* is said to be a variety of this in which some of the leaves are subulate and spreading. There are also the varieties *aùrea* and *argéntea* with gold and silver variegated foliage; and a miniature form called *pýgmæa*, syn. *Thuja pýgmæa.*

R. ericoìdes, syn. *Cupréssus ericoìdes*, a well-known compact conical dwarf bush, and the first of the genus cultivated in this country, is considered by some as the primordial form of *R. obtùsa*, and by others it is referred to *R. leptoclàda.* In this all the leaves are linear and spreading, densely arranged in four ranks on the slender branchlets, somewhat rigid and acute, bright green above and glaucous beneath, assuming a ruddy tint in winter. It grows from 2 to 4 feet high.

3. *R. plumòsa.*—The varieties ranged under this name are exceedingly beautiful dwarf shrubs with very dense slender flexible feathery branchlets dotted with acicular more or less spreading leaves. The one called *argénteo-variegàta* resembles *ericoìdes* in its foliage, except that it is soft, silvery and pale green; but the branches are less regular, and the branchlets slenderer and flexible. Probably this and the other varieties under this name belong to some of the other species.

4. *R. squarròsa.*—A dwarf spherical shrub with slender drooping branches and minute imbricate scale-like foliage of a silvery green. It is reported as being rather tender.

R. leptoclàda, syn. *R. squarròsa leptoclàda*, is a more erect-

growing compact shrub with glaucous green imbricate foliage. It is said to be quite hardy in England.

17. GLYPTOSTRÒBUS.

Deciduous or at least not truly evergreen trees or shrubs. Leaves scattered, small, variable, either imbricated or spreading. Flowers monœcious. Scales of the conoid fruit leathery, with two seeds at the base of each. The generic name is from γλυπτός, carved or engraved, and στρόβος, a cone, in reference to the embossed scales. There are two species described, both natives of China, and one extending to Japan.

1. *G. pèndulus*, syn. *Taxòdium dístichum* var. *pèndulum*, and *T. Sinénse*.—A small tree with pendulous branches, excessively slender deciduous branchlets, and appressed or spreading very small linear-acute bright green leaves. Cones small, oblong or ovate, with pointed scales. A beautiful hardy tree from North China and Japan.

2. *G. heterophýllus*, syn. *Taxòdium nucíferum*, etc. Chinese Water Pine.—A small tree with variable closely imbricated scale-like or linear and spreading glaucous green leaves. Cones oblong, scales unequal, with a recurved point. A native of China, rather tender in this country.

18. TAXÒDIUM.

Deciduous monœcious trees with distichous leaves and small globular or oval cones composed of peltate woody scales with 2 seeds at the base of each. All the known forms of this genus are usually referred to one species, a native of the United States of North America. The name is derived from τάξος, the Yew, and εἶδος, resemblance, referring to the disposition of the foliage.

1. *T. dístichum*. Deciduous or Bald Cypress.—A large tree with slender often deciduous ultimate branchlets, and soft linear-acute distichous crowded leaves from 6 to 9 lines long. Cone close and hard, about 1 inch in diameter. This is an exceedingly beautiful and graceful tree, and of the few hardy deciduous Conifers the one most frequently planted. It is very variable in habit and size of foliage, and some of the forms have received various names either as distinct species or varieties of this. The shrub called *T. dístichum pèndulum* belongs to the preceding genus.

19. CRYPTOMÈRIA.

Evergreen trees with rigid linear-falcate acute quadrangular scattered leaves. Flowers monœcious. Male catkins solitary in the axils of the upper leaves. Cones less than an inch in diameter, terminal and solitary, sometimes growing out at the points. Scales loose, cuneate, prickly, with from 3 to 6 winged seeds. The name is compounded of *κρυπτός*, concealed, and *μερίς*, a part, from the nature of the inflorescence. The only known species is a native of Japan, but some of the forms have been described as distinct species.

1. *C. Japónica.* Japanese Cedar.—A handsome rapid-growing tree from 50 to 100 feet high. Branches brittle and readily separating from the trunk. Leaves rigid, incurved, crowded, spirally arranged, from 6 to 9 lines long. This forms a beautiful object in well-drained soils and sheltered situations, but is too tender for rich moist soils, and exposed to strong winds it soon becomes stripped of its branches. There are several varieties distinguished as: *variegàta*, described as one of the most desirable of variegated Conifers; *nàna*, a very dwarf form; *víridis* or *Lóbbii*, with foliage of a brighter green; and *élegans*, of a more slender graceful habit.

20. SAXE-GÓTHÆA.

A genus of one species, an evergreen tree of small dimensions resembling the Yew in foliage. Flowers monœcious. Males in clustered catkins. Fruit small, terminal, composed of irregular fleshy pointed scales. This genus was dedicated to the late Prince Consort, from a German title borne by him. It is sometimes referred to the *Taxìneæ*, and closely connects these two groups.

1. *S. conspícua.*—This is described as a small tree about 30 feet high. The leaves are distichous, linear-acute and coriaceous, from 8 to 12 lines long, silvery beneath. Although it has been introduced some years, it is still rare in British gardens owing to tenderness in most localities. It is a native of Patagonia.

Tribe III.—*TAXÌNEÆ.*

Fertile flower solitary, ripening into a fleshy fruit.

21. TÁXUS.

Evergreen usually dicœcious shrubs or trees with scattered or distichous linear decurrent leaves. Male flowers in small globular catkins. Female flowers solitary, bracteate at the base, with one erect seed seated on a disk which enlarges into a coloured fleshy cup around the lower part of the seed. The forms of Yew are numerous, and the extreme ones very distinct; but there are probably not more than three or four species and perhaps only one. They are found in temperate regions throughout Europe, Asia and North America. *Taxus* is the classical name of the Common Yew, but its derivation is disputed and variously explained. The most probable is from *τόξον*, a bow, in allusion to the use made of the wood.

1. *T. baccàta.* Common Yew.—This tree is remarkable for its slow growth and sombre foliage, enlivened in Autumn by the small scarlet fruits. It is indigenous in Britain, and many fine old trees exist, especially in burial grounds. Besides the ordinary form, which it is unnecessary to describe, there are many others of garden or wild origin, some of them very striking. The most familiar is the variety *fastigiàta* or Irish Yew, easily recognised by its close erect habit and very dark green foliage. *T. baccàta Dovastòni*, Weeping Yew, is remarkable for its drooping habit. The American form, *Canadénsis*, is a dwarf straggling shrub with rather shorter leaves than the English Yew. In America it bears the name of Ground Hemlock. *Hibérnica* has spreading branches; *ericoìdes* unusually small foliage; *erécta*, syn. *stricta* and *pyramidàlis*, is very distinct, branching from the base, forming many slender nearly erect stems; *Cheshuntiénsis* is a fast-growing variety, intermediate in habit between the common and Irish Yews, with bright glossy foliage. *Jacksònii*, *grácilis*, *nàna*, *Mitchélli* or *sparsifòlia*, *horizontàlis*, etc., are slight varieties scarcely worthy of discrimination. The variety *glaùca* is described as desirable and rapid growing, having the foliage silvery on the lower surface. Some of the variegated varieties are very handsome when planted in cool shady places. The gold and silver striped *aùrea variegàta* and *argéntea variegàta*,

and *elegantíssima*, an erect fast-growing variety beautifully variegated with yellow, are the best. There is also a variety which produces yellow berries.

2. *T. adprέssa*, syn. *T. baccàta adprέssa*, *T. tárdiva*, etc.—Whether this be specifically distinct or not from the Common Yew, it is sufficiently different in appearance and foliage to be equally if not more desirable for the shrubbery. It has short oblong-oval acute crowded glossy dark green leaves and pale pink berries. In habit this is very near the ordinary form of the Common Yew, but it is of very slow growth and seldom exceeds 5 or 6 feet in height. It is a native of the mountains of Japan, and very hardy in Britain.

T. cuspidàta is a rare Japanese species remarkable for its sharply-pointed rigid leaves; *T. brevifòlia*, syn. *T. Lindleyàna*, is from North-western America, near the Common Yew, but with shorter less coriaceous distinctly petiolate mucronate leaves; and *T. Wallichiàna*, syn. *T. nucífera*, found in the mountains of India, is probably a variety of the Common Yew.

22. TÓRREYA.

Yew-like shrubs or trees with regular whorled branches and distichous or scattered leaves. It differs from *Táxus* chiefly in the fruit, which is much larger and destitute of the succulent cup that characterises the fruit of the latter genus. The outer coat is fleshy, and the inner a hard woody shell enclosing the usually ruminated albumen of the seed, whence the name of Nutmeg applied to the Californian species. The few species described are natives of China and Japan and North America. Named in honour of J. Torrey, of New York, a botanist of distinction. With the exception of *T. grándis* they emit a very powerful and unpleasant odour when bruised or burned; hence the American name, Stinking Yew.

1. *T. grándis.*—A large tree with linear-lanceolate acute distichous leaves from 8 to 12 lines long, dark glossy green above, silvery beneath. Fruit oval; albumen not ruminated. A native of the mountains of North China, where it forms a beautiful spreading tree. It appears to be very rare in British gardens.

2. *T. Califórnica*, syn. *T. Myrística.* Californian Nutmeg Tree.—A small round-headed tree with linear-acute distichous shortly petiolate pale-green leaves about 2 inches long, and oblong green fruits about the size of an ordinary nutmeg, and

with similarly ruminated albumen. It is found on the Sierra Nevada Mountains of California.

3. *T. nucífera.*—A small tree of extremely slow growth with linear sharply-pointed scattered or distichous dark green shining leaves from 1 to 1½ inch long. Fruit oblong-ovate, about 9 lines long. Native of Japan.

4. *T. taxifòlia.*—A tree with spreading branches from 20 to 40 feet high in its native habitat, but of exceedingly slow growth in Britain. Leaves rigid, linear, very acute, yellowish green, from 1 to 1½ inch long. Fruit usually more than an inch long, oblong, glaucous green. A native of Florida.

23. PODOCÁRPUS.

Evergreen shrubs or trees with linear-lanceolate or oblong scattered or distichous leaves. Flowers sub-dicœcious. Female flowers solitary, axillary. Fruit drupoid, on a thick fleshy peduncle, which suggested the generic name, from *πούς*, a foot, and *καρπός*, a fruit. This genus is numerous in species, but they are chiefly from warm or tropical countries, from Japan southwards to Australasia, and in South America. A few are sufficiently hardy to bear our climate.

1. *P. Japónica*, syn. *P. Chinénsis*, *P. coriàcea* of gardens (not of Richard), and *Táxus Japónica.*—An erect slow-growing shrub, closely resembling the Irish Yew both in habit and foliage, but the branches are stouter and the leaves from 2 to 3 inches long and 2 to 3 lines broad, and silvery beneath. A handsome hardy shrub, native of Japan.

P. Andìna, syn. *Prumnopítys élegans*, is a Chilian species with lanceolate coriaceous glossy dark green foliage, silvery beneath. *P. nubígœna*, from the same country, with linear-lanceolate leaves; and *P. Koraina* is a very ornamental Japanese species of recent introduction.

24. CEPHALOTÀXUS.

This genus with the foliage of the Yews has the dicœcious flowers in clusters, and the fruits large and plum-like, and two or three together. The name is a compound of *κεφαλή*, a head, and *τάξις*, arrangement, from the disposition of the flowers. About five or six species are known, natives of China and Japan.

1. *C. Fortùnei*, syn. *C. Fortùnei mas*, *C. Fortùnei péndula*, and *C. filifòrmis.*—A tree from 40 to 50 feet high with

distichous linear straight flat acute leaves about 3 inches long, dark shining green above and glaucous beneath. Fruit oval or oblong, one-seeded, with a thin purplish flesh. A very distinct and ornamental tree with spreading branches in regular whorls. It is a native of Northern China, and somewhat tender in this country.

2. *C. drupàcea*, syn. *C. Fortùnei fœmina.*—A small tree from 20 to 30 feet high. Leaves crowded, in two ranks, rigid, linear, curved, from 1 to 1½ inch long, yellowish glossy green above, glaucous beneath. Fruit purple, oval-oblong, about 1 inch in length. From China and Japan, rather hardier than the preceding, and said to succeed best in a moist shady situation.

C. pedunculàta, syn. *C. Harringtònii*, is a Japanese species with long dark green leaves and large drupaceous fruits on long peduncles; and *C. umbraculífera* is another Japanese species, with shorter leaves and still larger fruits.

25. SALISBÙRIA.

Only one species of this genus has been described. It is a deciduous tree with fan-shaped petiolate leaves, diœcious flowers, and pedunculate 1-seeded drupoid fruits upon a fleshy disk. Dedicated to an English botanist.

1. *S. adiantifòlia*, syn. *Gíngko bìloba.* Maiden-hair Tree.—This is one of the most striking of hardy exotic trees, and one which differs so much in habit and foliage from all others belonging to this order that in the absence of flowers or fruit it would be almost impossible to assign it to its proper position in the Vegetable Kingdom. It forms a large handsome tree with fan-shaped coriaceous pale-green leaves on long peduncles. The veins of the leaves are very dense and parallel, and the blade is usually deeply bilobate. The male flowers are in slender axillary catkins, and the female flowers are fascicled and pedunculate. The fruit is a one-seeded fleshy globular or oval drupe, about one inch in diameter, partially imbedded in the fleshy cup-shaped disk. This tree is a native of China and Japan, and was introduced into this country a little more than a century since; but it is said that only the male plant is in cultivation.

Nagéia includes several tender Japanese shrubs or trees usually incorporated with *Podocárpus*. They have ovate or lanceolate ribbed leaves and drupaceous fruits. *N. Japónica*

has oblong-lanceolate leaves about 3 inches long, and *N. ovàta* has rather smaller ovate cuspidate leaves. There are handsome variegated varieties of both species.

Dacrýdium, *Microcáchrys*, and *Phyllocàdus* are Australasian genera belonging to this tribe, but none of their species are sufficiently hardy for our climate.

Order CXI.—GNETACEÆ.

This is a small order or, as considered by some, a tribe, of the *Coníferæ*. The species are shrubs or trees with jointed branchlets and simple net-veined broad or small scale-like leaves. The fruit is a small 2-seeded berry in the only genus concerning us. There are only three genera referred here. *Gnètum* has large opposite leaves, and *Welwítschia* is remarkable for its short thick tabular flat-topped trunk with two opposite leaves.

1. EPHÈDRA.

This genus consists of trailing shrubs with numerous very long slender jointed green branches, and small scale-like leaves. The fruit is a 2-seeded berry. These shrubs inhabit the rocky shores of the Mediterranean and salt plains of Asia. The generic name is of Greek origin, and was applied by the ancients to the Horsetail (*Hippùris vulgàris*).

E. altíssima and *E. distáchya*, from the Mediterranean region, and *E. monostáchya* from Siberia, will flourish near the sea in the South-western counties. They are suitable for covering rock-work or pillars. The first is very showy when covered with its scarlet berries.

Sub-Class II.—MONOCOTYLEDONS or ENDOGENS.

Stem destitute of central pith, not increasing by annual layers, vascular bundles irregularly scattered amongst the cellular tissue. Leaves usually parallel-veined. Seeds with 1 cotyledon. Parts of the flower generally in whorls of three.

Division I.—*PETALOIDEÆ.*

Perianth usually composed of 6 segments arranged in 1 or 2 regular whorls, all or some of them coloured, or rarely green. For exceptions see *Aroìdeæ* and *Typhàceæ.*

Order I.—PALMÀCEÆ.

This noble family of arborescent plants unfortunately contributes but little towards the permanent decoration of our gardens in consequence of none of the species being perfectly hardy in our climate. But as some of the more robust species are employed in the sub-tropical garden during the Summer months, we must devote a little space to their consideration. With very few exceptions, the Palms have unbranched stems crowned with a tuft of usually very large leaves. The extreme forms exhibit two distinct kinds of foliage, though there are species having foliage of a somewhat intermediate character. There is the flabelliform or fan-shaped leaf, as in *Livistòna australàlis*, syn. *Corỳpha australàlis* (fig. 221), a handsome Australian species with immensely large shining leaves and a trunk from 50 to 70 or more feet high; and the pinnate or feathery leaf, as in the Date Palm, *Phœnix dactylífera* (fig. 222), which grows from 60 to 80 feet high, and is extensively cultivated in Northern Africa and elsewhere for its edible fruit. Before enumerating a few of the hardier species suitable for the embellishment of the garden in Summer, we will give the principal technical characters. The stems of

Palms, like all other Endogenous plants, scarcely increase in diameter, that is to say, they do not add to their size by concentric woody layers, but the trunk merely lengthens and consolidates as it unfolds new leaves. The flowers are either unisexual



Fig. 221. Livistona australis.

or hermaphrodite and individually small and inconspicuous, but commonly exceedingly numerous and arranged on large branching spadices enclosed in a foliaceous spathe, which opens when the flowers are about to expand. The entire inflorescence of some species is of immense proportions. The structure of the flowers is tolerably uniform, being composed of 6 perianth-segments in two more or less distinct series, and from 3 to

an indefinite number of stamens. The ovary is superior and composed of 1 to 3 more or less combined 1- or rarely 2-seeded carpels. Fruit drupaceous or nucamentaceous, and often clothed with fibres or imbricated scales. Seeds albuminous,



Fig. 222. Phœnix dactylifera.

often large. The Date Palm mentioned above is best known to us through its dried fleshy fruits, the edible part being the pericarp or seed-vessel. Another fruit produced by a member of this family, and even more familiar than the Date, is the Cocoa-nut, the product of *Còcos nucífera.* Here the part eaten is the albumen and milk of the seed. The following are some of the best for withstanding the winds and other adverse influences which our climate displays even in Summer. 1. Species with fan-shaped leaves: *Sàbal Palmétto, S. umbra-*

culífera, *Chámærops excélsa*, *Ch. Fortùnei*, *Ch. hùmilis*, and *Livistòna austràlis*. 2. Species with feathery leaves: *Jubæa spectábilis*, nearly hardy; *Seafórthia élegans*, and various species of *Phœnix* and *Còcos*. We ought to mention, however, that scarcely any of these will retain their beauty except in warm sheltered localities. *Chámærops hùmilis* is the only European species, and *Ch. Fortùnei*, a native of China, is the only species sufficiently hardy to withstand our winters in the most favoured situations of the mildest parts of England.

Order II.—AROÌDEÆ.

Herbs with tuberous rhizomes, large radical usually net-veined leaves, and spathaceous inflorescence. Flowers on a spadix, unisexual or hermaphrodite. Perianth none, or consisting of 4 to 8 hypogynous divisions. Stamens definite or indefinite. Fruit baccate, one- or more celled, one- or more seeded. A large order containing about 100 genera and 1,000 species, chiefly inhabiting tropical countries. We have three representatives in our native flora. The commonest is *Arum maculàtum*, Lords-and-Ladies, or Cuckoo-Pint. *A. Itálicum* has only been observed in the South of England. *Ácorus Cálamus*, Sweet Flag, has equitant ensiform leaves and a tall compressed spathaceous scape, and a lateral spadix crowded with very small bisexual flowers. It is rare and local in England. The species worth introducing into the flower garden are limited in number.

1. CÁLLA.

Aquatic or marsh plants with white spathes and cordate leaves. The flowers are destitute of a perianth and either unisexual or bisexual, and crowded at the summit of the spadix. Berries red. A genus of few species inhabiting Europe and North America. The name is from καλός, beautiful, in allusion to the spathe of some species.

1. *C. palústris.*—A dwarf creeping perennial aquatic or marsh plant with cordate leaves on long petioles, and flat open ribbed spathes. A native of Europe and North America, and very pretty for introducing into small ponds or basins.

Richárdia Æthiópica, syn. *Cálla Æthiópica* (fig. 223), Trumpet Lily, so commonly seen in cottage windows, etc., will

succeed as a water plant in the South-west if planted at a sufficient depth. The fine foliage, pure white spathe, and



Fig. 223. Richardia Æthiopica. (About ⅓ nat. size.)

yellow spadix are too well known to need further description. This plant is a native of the Cape of Good Hope.

2. ÀRUM.

Erect or dwarf perennials with thick rhizomes and pedate or hastate leaves. Flowers devoid of perianth, unisexual, clustered on the lower part of the spadix; female flowers below, and separated from the males by barren or rudimentary ones. Spathe large, convolute; spadix naked and club-shaped at the top. About forty species are known, from the temperate and warm regions of the North. The derivation of the generic name is doubtful. Besides the British species alluded to above, there are two or three other hardy species occasionally seen in gardens. Of

these *A. Dracúnculus*, syn. *Dracúnculus vulgàris*, is perhaps the best known. It grows from 2 to 3 feet high, with the petiolate leaves pedately divided into five lanceolate segments. The stem and petioles are covered with dark purplish blotches. Spathe green outside and purplish within. South Europe.

Order III.

HYDROCHARIDÀCEÆ.

A small order of aquatic herbs with erect floating or immersed leaves. Unisexual flowers pedunculate, emerging from a small spathe. Perianth of 6 segments, the inner 3 usually larger and coloured. Stamens three or more. Fruit inferior, submerged, 1- to 6-celled, dry or succulent. There are two native species of some interest, namely, *Hydrócharis Mórsus-Ràna*, Frog-bit, and *Stratiòtes aloìdes*, Water Soldier. The former is a floating herb with orbicular leaves and white flowers, male and female similar, with the inner segments of the perianth larger and crumpled. The latter is a submerged stoloniferous plant with radical long narrow toothed leaves, solitary female and clustered male flowers. Confined in Britain to Eastern England.



Fig. 224. Typha latifolia. (About $\frac{1}{10}$ nat. size.)

Order IV.—TYPHÀCEÆ.

Semi-aquatic herbs with a creeping rootstock, narrow linear sheathing leaves, and spicate or capitate monœcious flowers. Perianth none, or reduced to scales or hairs. Stamens definite or indefinite. Fruit dry or succulent, 1-celled and 1-seeded. There are two British genera of this affinity. 1. *Tỳpha*, Cat's-tail, Bullrush, or Reed-mace, having the flowers in cylindrical spikes, the males at the top. *T. latifòlia* (fig. 224) is a striking plant from 3 to 8 feet, in which the male and female portions of the spike are contiguous. *T. angustifòlia* is a smaller species with narrower leaves and a distinct separation of the male and female flowers. 2. *Spargànium*, Bur-reed, has the flowers in racemes of globose heads furnished with large leafy bracts. *S. ramòsum* with a branched inflorescence, and *S. símplex* with a simple spike, are both common plants.

Order V.—ALISMÀCEÆ.

Aquatic or marsh plants with simple radical leaves and leafless flower-scapes. Flowers hermaphrodite or unisexual. Perianth inferior, all the segments or only the three inner coloured, often fugacious. Stamens 6 or 9 or more. Fruit of 3 to 6 or more dehiscent or indehiscent 1- or more seeded carpels. Seeds destitute of albumen. This small order comprises about 50 widely dispersed species. Besides the following there are about half a dozen other British species, the most conspicuous of which are the Water Plantains (*Alísma*). *A. Plantàgo* is the common conspicuous species with erect lanceolate ribbed leaves on long stalks, and a tall panicled scape with whorled branches bearing small fugacious flowers of which the three inner segments are pale rose colour.

1. SAGITTÀRIA.

A genus of several tropical and temperate species of aquatic plants. The name is from *sagitta*, an arrow, from the form of the leaves in the earliest known species.

1. *S. sagittifòlia* (fig. 225). Arrow-head.—This is the only one that need occupy our attention. It is a common plant in the South of England, about a foot high, with ephemeral uni-



Fig. 225. Sagittaria sagittifolia. (½ nat. size.)

sexual flowers an inch or more in diameter, white with a purple centre. Segments of the perianth all similar; stamens numerous. It blooms throughout the Summer.

2. BŪTOMUS.

This is a genus comprising one or two very elegant aquatic plants with slender erect triquetrous leaves and a tall scape surmounted by a large umbel of rosy-pink flowers. Perianth-segments free, equal, all coloured. Stamens 9. Carpels about 6, many-seeded. The derivation of the generic name is obscure.

1. *B. umbellàtus.* Flowering Rush.—One of our handsomest native aquatics and the only British plant having 9 stamens. It grows from 3 to 6 feet high according to conditions, and flowers at Midsummer.

Aponogèton distáchyus is a handsome aquatic plant, remarkable for its floating branched spikes of small fragrant bracteate white flowers. Leaves oblong-lanceolate, on long petioles, floating. This plant is a native of the Cape of Good Hope, but it will flourish in a lake or stream if planted at a

depth of about 2 feet of water. It belongs to a small order called *Juncaginàceæ*, distinguished from *Alismàceæ* by the apetalous bracteate flowers.

Order VI.—ORCHIDÀCEÆ.

Terrestrial herbs with tuberous or fascicled roots and sheathing radical or sessile cauline leaves; or, as in most of the tropical species, epiphytes, with enlarged stems called pseudo-bulbs. Flowers solitary, spicate, racemose or paniculate. Perianth coloured, superior, composed of 6 irregular segments. The 3 outer are similar, and also the 2 lateral inner, whilst the lower inner segment, usually termed the labellum, assumes a variety of curious forms, and is often spurred at the base. Stamens and style confluent. Anther 1 and opposite the lip, or (in *Cypripèdium*) 2 and opposite the lateral inner lobes of the perianth; pollen cohering in 2, 4, or 8 waxy or granuliferous masses. Fruit a 1-celled 3-valved inferior twisted capsule, containing numerous very minute seeds attached to the valves. This order includes upwards of 400 genera comprising 3,000 species, abounding in all climates except the extreme cold. We have about 40 indigenous species belonging to 18 different genera. Like the majority of the terrestrial species they are more curious than beautiful, and as they hardly come within our limits, and more space than we can afford would be required to give intelligible descriptions, we must be content with mentioning the names of a few of the more interesting species. Foremost come the common Spring-flowering species of *Orchis*, *O. mascula* and *Morio* which throw up their spikes of purplish flowers from April till June. The handsomest perhaps of the genus is *O. pyramidàlis* which has rosy-crimson



Fig. 226. Cypripedium Calceolus. (¼ nat. size.)

or reddish flowers towards the end of Summer. The Bee Orchis, *Ophrys apífera*; Fly Orchis, *O. muscífera*; and the Spider Orchis, *O. aranífera*, are so named from the resemblance their flowers bear to those insects. The Helleborines, *Cephalánthera*, have leafy stems and white or rosy flowers. *C. grandiflòra*, with large white flowers, is a very conspicuous plant in copses on a chalky soil. A very common species is the Twayblade, *Listèra ovàta*, a plant about 18 inches high, with two opposite oval ribbed leaves, from between which springs a long slender raceme of yellowish-green flowers. None of these plants are of easy culture, and perhaps the terrestrial less so than the epiphytes, of which there are no hardy species. But still some careful gardeners contrive to grow some of them successfully, such as the Lady's Slipper, *Cypripèdium Calcèolus* (fig. 226), a rare indigenous plant with reddish-brown and yellow flowers, found in two or three localities only in the North of England. There are several more showy North American species; as *C. guttàtum*, purplish-violet spotted and edged with white; *C. cándidum*, white; *C. spectábile*, white tinged with purple, etc.

ERDER VII.—MUSÀCEÆ.

The species of Banana, *Mùsa*, are employed in the open air during Summer in sheltered localities for the sake of their broad effective foliage. They are stemless or caulescent herbs with large simple sheathing leaves often several feet long and spathaceous flowers which are not produced without the aid of artificial heat. *M. Sinénsis*, *M. coccínea* and *M. Ensète*, etc. are the species in general cultivation. But these are so rarely seen that detailed descriptions would be of little service.

ORDER VIII.—MARANTÀCEÆ.

This is another order of almost exclusively sub-tropical plants recently come into vogue for Summer bedding, which on account of their smaller stature, annual stems, and tuberous roots, are better suited for that purpose than many other tender plants. The structure of the flowers is somewhat singular. Perianth superior, composed of 6 segments in two series, the 3 outer forming a 3-lobed calyx, and the 3 inner a tubular irregular

1-lipped corolla. Stamens 3, petaloid, 2 barren, and 1 fertile. Fruit capsular. Various species and varieties of the genus *Cánna*, Indian Shot, are grown for the purpose indicated. They



Fig. 227. Canna Indica. (About $\frac{1}{5}$ nat. size.)



Fig. 228. Thalia dealbata. (About $\frac{1}{5}$ nat. size.)

are tufted herbs with handsome sheathing leaves and spikes of yellow, scarlet or orange flowers. *C. Índica* (fig. 227), a native of South America, has bright scarlet flowers; *C. glaùca* is an East Indian plant with pale yellow flowers and glaucous foliage.

C. édulis, from South America, is a taller species, 5 to 6 feet high, with reddish stems and orange-scarlet flowers; *C. coccínea*, from the same country, has scarlet flowers with the labellum spotted; *C. angustifòlia* or *speciòsa*, from Brazil, has narrower leaves than any of the preceding, and yellow and red flowers; *C. Warscewiczii*, from New Grenada, has dark-coloured stems and purple-bordered foliage. There are many other species and varieties in cultivation, and the number is increasing every year, so that the latest information can only be gleaned from the florists' catalogues.

Thàlia dealbàta (fig. 228) is a hardy North American plant belonging to this family. It is an elegant herbaceous aquatic from 2 to 4 feet high with fine glaucous foliage and handsome panicles of purple flowers. It should be planted in a good depth of water to enable it to resist the effects of our Winters.

The exclusively American order, *Bromeliàceæ*, belongs to the group of Endogens, with an inferior seed vessel; but only the three inner perianth-segments are petaloid. *Pùya Chilénsis*, syn., *Pourrètia coarctàta*, a half hardy shrub, is one of the largest species. It has a branching stem of three to four feet high, crowned with rosettes of tough linear leaves, from the centre of which spring the large spicate panicles, six to eight feet high, of yellow flowers.

Order IX.—IRIDÀCEÆ.

Perennial often tuberous-rooted herbs with usually glabrous equitant distichous leaves and terminal bracteate spikes, umbels, corymbs or panicles of showy flowers. Perianth superior, composed of six divisions in two series, equal or unequal, the inner sometimes smallest. Stamens 3. Stigmas often petaloid. Fruit an inferior 3-celled many-seeded capsule dehiscing loculicidally. Seeds spheroid, angular or winged, albuminous. This order comprises about 50 genera and 500 species, dispersed throughout the temperate regions of the whole world. The British species are few and rare, with the exception of *Iris Pseudácorus*, the Yellow Flag.

1. SISYRÍNCHIUM.

Tuberous or thick fibrous-rooted plants with grass-like radical equitant leaves. Flower-scape usually flattened and two-edged. Flowers umbellate or solitary. Perianth regular,

spreading or campanulate, segments equal, tube short. Stamens on the throat of the perianth. Stigmas three, entire, chiefly from North and South America. The etymology of the name is uncertain. There are two or three hardy species in cultivation.

1. *S. Bermudiànum*, syn. *S. ánceps.* A dwarf species from 12 to 18 inches high, with linear leaves and a sharply two-edged flower-scape. Flowers few in each umbel, bright blue, perianth-segments mucronate. A native of North America, flowering in Summer.

2. *S. convolùtum*, syn. *Márica convolùta.*—A rather tender species about six inches high, growing in dense tufts. Scapes about 3- or 4-flowered. Flowers yellow, appearing in May. South America.

3. *S. grandiflòrum.*—A pretty tuberous-rooted plant with the aspect of *Íris Xíphium.* Scapes nearly round, bearing 3 or 4 large campanulate purplish-violet or white flowers. This is the handsomest of the genus and one of the hardiest. It is a native of North America, and blooms from April to June.

There are several other less hardy species occasionally seen: as, *S. bìcolor*, violet spotted with yellow; *S. odoratíssimum*, with very fragrant white flowers; and *S. Califórnicum*, with bright yellow flowers.

2. LIBÉRTIA.

A small genus differing from *Sisyrínchium* in the outer perianth-lobes being smaller than the inner and often green, free or almost free filaments, and versatile anthers. Flowers always white, arranged in sub-umbellate panicles. The species are natives of Australasia and South America and rather tender. Named after a Belgian lady-botanist. *L. ixioìdes* is a New Zealand species from 2 to 3 feet high with rigid linear foliage and close clustered simple panicles of white flowers about an inch in diameter. *L. Magellánica* is a dwarfer plant with denser spikes of pure white flowers. The latter is sometimes sold under the name *formòsa.*

3. VIEUSSEÚXIA.

Half-hardy South African tuberous-rooted herbs with narrow equitant and branching stems bearing pedunculate flowers which exceed the spathaceous bracts. Perianth with the 3 inner segments much smaller than the outer. Filaments united in a tube. This genus was named in honour of a Swiss phy-

sician. There are several ornamental species, but being tender they are little grown. *V. glaùcopis* has the large outer perianth-segments of a pure white with a blue spot in the centre encircled with brown. *V. villòsa*, syn. *Morèa villòsa*, has lilac flowers whose outer perianth-lobes have a blue blotch separated by a black stripe from the orange centre.

4. FERRÀRIA.

Near *Morèa*, but with the filaments united in a tube and the petaloid stigmas fringed. A South African genus of several species with curiously spotted evanescent flowers. *F. undulàta* has the flowers spotted with purple upon a green ground, and there are many other remarkable species. Named after Ferrari, an Italian botanist.

5. MORÆA.

Plants very much resembling the Irises, but with all the divisions of the perianth equally spreading. Perianth-tube short, the three inner segments of its limb smaller, convolute after flowering. Stamens distinct. Style slender, with three petaloid bifid stigmas. Leaves few and narrow. Flowers of various colours, rising from spathaceous sheaths. Chiefly from South of Africa. Named in honour of R. Moore, an English botanist. The species are numerous and very showy. We may mention: *M. bìcolor*, yellow, the outer petals with a dark purple spot encircled with orange, much larger than the inner; *M. iridioìdes*, white, with yellow or brown spots; *M. édulis*, very much like an Iris, with violet flowers, outer lobes of the perianth with a yellow spot at the base. *M. Sisyrìnchium*, syn. *M. Tenoriàna* and *Ìris Sisyrìnchium*, is a South European species, with purple or blue flowers.

6. SCHIZOSTŸLIS.

This genus consists of one species, *S. coccíneus*, a very beautiful South African plant. It has a leafy stem about 3 feet high and bright crimson flowers similar to those of *Gladìolus*. Perianth salver-shaped, with equal spreading segments; stigmas filiform. From $\sigma\chi\acute{\iota}\zeta\omega$, to cut, and $\sigma\tau\hat{\upsilon}\lambda o\varsigma$, a column, in allusion to the filiform stigmas.

7. TIGRÌDIA.

American bulbous dwarf plants with ensiform leaves as in *Ìris*. The flowers are large and beautiful, but of short duration, always terminal, orange or yellow richly spotted, hence the name Tiger-Flower. Perianth-tube short, limb spreading, the

outer segments larger than the inner. The filaments of the three stamens are connate in a long tube.

1. *T. Pavònia.*—This is the most popular and at the same time the most beautiful species. It is a native of Mexico, long since introduced into Europe. The flowers are large, from 5 to 6 inches across, with the three outer segments of the most brilliant crimson red, and the inner ones curiously marked with carmine and violet-purple upon a yellow ground.

A second species, or rather a variety of the same, is the Yellow Tiger-Flower, *T. conchiflòra*, which differs only in having the exterior petals yellow. *T. violàcea* is a pretty little miniature of the foregoing with the same habit and colouring on a smaller scale, and a lilac-amaranth ground. *T. azùrea* is a lovely little plant, but the flowers last only a few hours. The ground colour of the outer petals here is azure-blue, and the interior petals are of a bright yellow bordered with the most intense blue, and yellow marbled with purple towards the centre.

8. ÌRIS.

A familiar genus very numerous in species, and among the most ornamental of hardy monocotyledonous plants. Herbs with fleshy rhizomes, or in a few species bulbous or with fibrous roots. Leaves sword-shaped or linear, often equitant. Perianth-tube short, with the three outer segments reflexed, often bearded at the base, and the three inner erect, generally smaller than the outer. Stamens 3, inserted at the base of the outer segments; anthers turned outwards. Style triquetrous, with 3 petaloid stigmas opposite the stamens. Capsule 3-celled, many-seeded. Natives of the northern hemisphere, chiefly in temperate Europe and Asia. Name from the Latin *iris*, the eye. The species are naturally divided into two distinct sections:—the one with ensiform leaves and creeping rhizomes or fleshy fibrous roots; and the other with bulbous roots and usually flat or incurved leaves. Amongst the ensiform group we may mention:—

1. *I. Susiàna.*—A Persian species introduced into Europe towards the end of the sixteenth century. It is a gorgeous plant, possessing the largest flowers in the genus, and growing about 2 feet high. In this species the inner segments of the perianth are the largest; all are of a lurid grey or brown, reticulated with dark purple, and the outer ones strongly bearded. Flowering in April and May.

2. *I. Germánica* (fig. 229).—This is the commonest of this

section in cultivation. It is a native of Central Europe, and extremely hardy. There are numerous varieties, and many of them are strikingly handsome. The prevailing colour is some shade of blue or violet, occasionally yellowish or white, and prettily reticulated. The segments of the perianth are nearly equal. Leaves large and fleshy; stems several-flowered; flowers stalked. The flowers appear from May to July.



Fig. 229. Iris Germanica. (¼ nat. size.)

3. *I. Florentìna.*—Scarcely differing from the last, but distinguished from it by its quite white flowers rayed with pale yellow on the outer divisions. The rhizome is odoriferous and officinal, under the name of Orris-root.

4. *I. variegàta.*—From Austria and Hungary, with linear channelled leaves and large yellow flowers, whose exterior segments are bearded and marked with brown, and bordered with pale rose.

5. *I. lùrida.*—A South European species with robust broad leaves and medium flowers, brownish violet tinged with yellow.

6. *I. spùria.*—Native of Spain and Barbary, having long acute leaves and bright blue medium flowers with a large bright yellow spot on the three outer segments. Not so hardy as some.

I. ochroleùca is similar to the foregoing, from the same countries, and probably only a variety of it. Flowers of a yellowish white with a blotch of bright yellow on each of the outer perianth-segments. *I. versícolor* is a dwarf North American species with short leaves and much smaller flowers than in any of the preceding, of a violet brown with a bright yellow spot on the very broad limb of the three outer segments. *I. cristàta* also a North American species, of very diminutive stature, about 6 inches high, and very short leaves. Flowers below the middle size, geminate, of a bright blue, with a yellow spot on the outer segments. May or June. *I. praténsis*, syn. *I. Sibírica*, is a native of Central Europe and Russia. A pretty plant with grass-like leaves and blue flowers.

7. *I. Pseud-ácorus.* Yellow Flag.—This is the common indigenous species, growing about a yard high, with long acute bright green leaves and large clear yellow flowers. Suitable for lakes and swampy places.

I. Monnièri, from S. Europe, is a similar plant, with larger and brighter yellow flowers.

8. *I. fimbriàta.*—Of Chinese origin, and one of the handsomest of the genus. Flowers large, of a bright blue variegated with dark brown on the outer segments, which are undulated. Stigmas erect, petaloid and fringed. A tender species.

9. *I. arenària.*—The dwarfest of the genus, from 2 to 4 inches high. Flowers scarcely exceeding the leaves, of a uniform yellow. A native of the sandy plains of Hungary.



Fig. 230. Iris Xiphium. (¼ nat. size.)

We now come to the bulbous section, which is by no means so numerous in species as the foregoing.

10. *I. Xíphium* (fig. 230).—Commonly known in English gardens as the Spanish Iris. Stems from 9 inches to a foot high, and furnished with narrow acute leaves. Flowers of medium size, two or three together, with narrow nearly equal segments. The natural colour is an azure blue, but there are many varieties in cultivation ranging through all shades of blue, associated with yellow and chestnut.

11. *I. xiphioìdes.* English Bulbous Iris of florists.—Slightly different from the last, but usually 1-flowered, and the flower larger. The three exterior segments are of a bright yellow, with an orange spot in the centre of the limb, the three interior blue or violet. There are also many beautiful garden varieties of this species. This and the last are both natives of South-western Europe.

12. *I. spectábilis.*—Similar in habit, but taller than the two last. The outer perianth-segments brownish, with a large orange blotch in the middle of the limb; the three interior of a deep violet.

13. *I. Pérsica.*—A charming plant from Western Asia, formerly widely spread in gardens, but now become rather rare.

It is distinguished from the preceding by its dwarf stem and early flowers, which appear towards the end of Winter, before the leaves are fully developed. It is very hardy and admirably adapted for edging beds or borders.

14. *I. tuberòsa.*—From Greece and Western Asia. Like the last, it was formerly in great request in our gardens, but has now also fallen into oblivion. The flowers are rather above the medium size, with the three outer segments of a dark purple, slightly reflexed and arched; the three interior are erect and greenish. This is a very hardy species, flowering a little later than the Persian.

15. *I. reticulàta.*—From the Crimea, differing in more than one respect from all the other species here enumerated. Each flowering stem bears only two leaves, which are quadrangular and longer than the stems. The flowers are solitary, with a long tube, giving them the appearance of being pedunculate. Their colour is of the brightest purple variegated with marblings of a darker tint and a large spot of yellow on the outer segments, with a delicious odour of violets. This is a very hardy and extremely handsome species.

16. *I. scorpioìdes.*—An Algerian species, differing from all the foregoing in its leaves, which are almost flat and very like those of the common Leek. The flower is solitary, of a very bright blue, with a yellow spot on each of the outer segments. The three interior perianth-segments are small and inconspicuous. It requires slight protection.

9. GLADÌOLUS.

A very extensive and beautiful genus of hardy and half-hardy bulbous plants, a few of which are natives of the South of Europe and Asia Minor, but the great majority are from South Africa. Plants with corms or bulb-like rhizomes, and erect slender leafy stems. Leaves broad and strongly nerved or narrow. Flowers spiked or racemose, in some species fragrant, displaying almost every shade and tint of colour imaginable, Perianth-tube curved, widening upwards, more or less irregular. Stigmas 3, flattened upwards. Named from the Latin *gladius*, a sword, in allusion to the resemblance of the leaves.

Among the European species frequently seen in old gardens we may mention *G. commùnis*, a pretty quite hardy plant throwing up numerous spikes of rose-purple flowers in July. There are likewise white and flesh-coloured varieties of this species. *G. Byzantìnus*, is a similar plant with larger flowers of a brighter

purple. Of the far more magnificent South African species we must limit ourselves to those more generally cultivated, and from which the numerous garden varieties have been raised:—*G. cardinàlis*, about 2 feet high, with red flowers, the inferior petals bearing in the centre a white or rose spot encircled with purple. *G. psittacìnus*, upwards of 3 feet high, distinguished by its long spike of yellow flowers, whose lower petals are spotted with rusty purple; *G. ríngens*, a superb plant with large slate-coloured flowers exhaling an odour of violets, and finely pitted and striped with violet, the lower petals with yellow spots; *G. cuspidàtus*, large creamy-white flowers bearing brown spots on the lower petals. *G. undulàtus*, white rayed with purple in the centre; *G. laccàtus*, rose-coloured; *G. ramòsus*, flesh-coloured; and *G. floribúndus*, purple spotted with white. The species mostly employed in hybridising are *G. cardinàlis*, *G. floribúndus*, and *G. psittacìnus*, and they have given birth to innumerable beautiful varieties either direct from seed or by intercrossing. Among the most notable is the *G. Gandavénsis* (fig. 231), raised in the garden of a celebrated Belgian amateur, the Duke of Arenberg. It is reputed to be the result of a cross between *G. cardinàlis* and *G. psittacìnus*. The flowers in this variety are of a bright vermilion shaded with rose, and yellow blotches on the lower petals. The anthers are of a deep violet colour, forming an agreeable contrast with the colours of the perianth. This and *G. Brenchleyénsis*, a beautiful scarlet, may be considered as standard varieties, and they are both extensively employed for planting in large beds.



Fig. 231. Gladiolus Gandavensis. (⅛ nat. size.)

10. PARDÁNTHUS.

A small genus of tuberous-rooted herbs from Eastern Asia, with equitant ensiform leaves, branched stems, spathaceous bracts, and orange-coloured flowers spotted with purple-brown. Perianth-segments equal, spreading, narrowed at the base; tube very short. Stigmas petaloid. Name from *πάρδος*, a leopard, and *ἄνθος*, a flower, in allusion to the spotted flowers.

1. *P. Chinénsis.*—This grows from 18 to 24 inches high, with

a leafy stem and numerous orange-red spotted flowers nearly 2 inches in diameter. A native of China, blooming in Summer.

11. IXIA.

Usually dwarf bulbous plants with slender wiry stems bearing simple or branched spikes of gaily coloured flowers. Perianth with a long slender tube and a regular salver-shaped limb. Stamens in the throat free or connate; stigmas narrow, linear, recurved. Species numerous, all South African, and very beautiful, but better suited for pot culture than in the open ground. The name is from *ixia*, birdlime, in reference to the nature of the juice. Almost every colour is represented in this genus, including one of the most beautiful greens. The following are some of the handsomest:—*I. trìcolor*, yellow in the centre and red in the circumference, the two colours separated by a band of black; *I. bulbífera*, yellow; *I. liliàgo*, white within, lilac without; *I. grandiflòra*, large dark purple flowers bordered with a narrow band of yellow; *I. viridiflòra*, a very beautiful plant with a slender stem about a yard high, bearing a long cluster of green flowers with a blue centre; *I. maculàta*, white with violet and rose centre; *I. cónica*, orange with black centre; *I. pàtens*, bright rosy carmine striped with deep purple; and numerous other equally beautiful species and garden varieties.

12. SPARÁXIS.

Similar to *Íxia*, but with a short perianth-tube widening into a funnel-shaped limb, and scarious lacerated or rarely entire bracts. Species numerous and beautiful, all from South Africa. Leaves ensiform; flowers on flexuous or zigzag scapes, large, distant and brilliantly coloured. *S. trìcolòr* is one of the handsomest and most widely spread species, and many very distinct and beautiful varieties have been raised from it. The name is derived from σπαράσσω, to lacerate, referring to the torn bracts.

13. MONTBRÈTIA.

South African tuberous or rhizomatous herbs with ensiform leaves and spicate flowers arising from spathaceous bracts. Perianth with a narrow often very long tube, gradually widening into a bell-shaped or salver-shaped limb. Stamens ascending. Bracts scarious, toothed, not jagged as in *Sparáxis*. Several species of this genus are in cultivation, and better known under the name *Tritònia*. *M. aùrea* with splendid orange-coloured

flowers, makes a beautiful bed treated in the same way as *Gladìolus.*

M. fucàta is yellow and scarlet, and *M. ròsea* is rose and white.

There are several other South African genera which contribute a few handsome species, such as *Babiàna*, *Watsònia*, and *Witsènia*; but they are strictly speaking greenhouse plants.

14. CRÒCUS.

It is unnecessary to go into the details of the technical characters of this familiar genus, farther than to enable the beginner to distinguish it from *Bulbocòdium* and *Cólchicum*, two genera very similar in habit though belonging to a different family with 6 stamens and a free ovary. The bulbs or corms are more or less densely clothed with fibrous coats. Leaves all radical, linear, enveloped in a scarious sheath at the base. Flowers solitary or fascicled, almost sessile on the bulb. Perianth-tube long and very narrow. Stamens on the bases of the outer segments. Ovary underground. Stigmas more or less cleft or fringed. Confined to the northern hemisphere in the Old World and particularly abundant in Asia Minor and the Mediterranean region. The old Greek name. The species and varieties in cultivation are exceedingly numerous and difficult of discrimination. We can only afford space for short descriptions of the commoner species.[1] For convenience



Fig. 232. Crocus vernus. (½ nat. size.)

[1] Chiefly taken from an outline key, kindly communicated by Mr. J. G. Baker.

we may divide them into vernal and autumnal species. The former alone are very generally cultivated, as they appear at a season when other flowers are scarce.

§ 1. *Flowers vernal. Stigmas not multifid.*

1. *C. vérnus* (fig. 232).—This is the species principally cultivated and the parent of numerous varieties both of garden and wild origin. Leaves dark green with a central longitudinal white stripe. The purple, violet, white and striped varieties of these colours belong to this species. The hairy throat of the perianth is the most reliable character. Widely distributed in Europe.

2. *C. reticulàtus*, including *C. Susiànus.*—Bulb-coats in this and the next species with very strong prominent fibres. Perianth naked at the throat; flowers yellow, distinguished from other yellow-flowered species by the brown colour of the exterior of the perianth-tube. South of Europe.

3. *C. variegàtus.*—Very like the last, but the flowers are purple. Asia Minor.

4. *C. lùteus.*—Bulb-coats with finer fibres; flowers yellow. To this are allied *C. aùreus*, *C. lagenæflòrus*, *C. stellàris*, and several other forms. South Europe and Asia Minor.

5. *C. biflòrus.*—Flowers white or striped externally with purple, yellow within. *C. versícolor* is referred to this. Crimea.

6. *C. Imperàti.*—Similar to the last. Flowers lilac striped with purple. One of the earliest blooming species. Italy.

§ 2. *Flowers autumnal. Stigmas not multifid.*

7. *C. satìvus.* Saffron Crocus.—This is the most familiar of the autumn-flowering Crocuses. Leaves not fully developed at the time of flowering. Flowers violet, variously striped, and marked with deeper or lighter tints. Perianth-tube hairy. Frequently seen in different countries in a naturalized state, but its native country is not known with certainty.

§ 3. *Flowers autumnal. Stigmas multifid. Leaves not appearing at the same time as the flowers.*

8. *C. specìosus.*—A beautiful large-flowered species. Flowers purple or blue, feathered with different tints. Stigmas yellow, conspicuously fringed. This includes *C. pulchéllus.* South-western Europe.

9. *C. nudiflòrus.*—Flowers of a uniform purple or violet. Perianth not hairy at the throat. This species is found in some parts of England, but is probably not indigenous. It flowers in October or November.

There are very many other species, some of which are occasionally seen in Botanic gardens, but the above include all the commonly cultivated forms.

Order X.—AMARÝLLIDEÆ.

Bulbous or rarely fibrous herbs, sometimes caulescent. Leaves ensiform or linear. Flowers solitary, umbellate or paniculate, frequently emerging from spathaceous bracts. Perianth superior, 6-lobed, variously formed, and often furnished with a corona at the top of the tube. Stamens 6, inserted upon the perianth and frequently united into a cup, or with intermediate staminodes. Fruit capsular and 3-celled, dehiscing loculicidally, or baccate and 1- to 3-seeded. Seeds albuminous. This order numbers about 70 genera and 400 species, found in nearly all temperate and tropical regions.

1. AMARÝLLIS.

Bulbous herbs with umbellate flowers destitute of a corona. Perianth-tube short, lobes strongly nerved. The plants constituting this genus and *Hippeàstrum* nearly all require more or less artificial heat in this country; but one, *Amarýllis Belladónna* (fig. 233), is nearly or quite hardy in the South if planted at a sufficient depth. It grows about a foot and a half high, producing towards the end of Summer large umbels of beautiful rose-coloured flowers pencilled with crimson. The strap-shaped leaves appear after the flower-stalks have died away. This is a native of South Africa, and has been cultivated in European gardens for upwards of two centuries. The generic name is of classic origin.

2. NERÎNE.

The Guernsey Lily belongs to this genus, and, though scarcely hardy, deserves mentioning here on account of its extensive culture. It received the name *N. Sarniénsis* in error, being a naturalized plant in Guernsey. It is a native of South Africa, and about the year 1680 a ship containing a quantity of its bulbs was wrecked in the Channel, and the bulbs

washing ashore struck root and increased. But it is no longer found there in a wild state. It is a very beautiful plant with



Fig. 233. Amaryllis Belladonna. (¼ nat. size.)

rose or scarlet umbellate flowers, appearing in Autumn before the leaves. Perianth 6-parted, tubeless.

3. LYCÒRIS.

Is now regarded as a section of *Amarýllis* with the undulated segments of the perianth curved upwards and the stigma fringed. There are several species, natives of China. *L. aùrea* is a very pretty plant flowering in Autumn before the leaves appear. The flowers are of a golden yellow.

4. STERNBÉRGIA.

A genus of dwarf bulbous plants mostly flowering in Autumn, before or with the growth of the leaves. Scape one-flowered. Perianth funnel-shaped, with a regular 6-parted limb. Stamens inserted at the summit of the tube. Named after Count Sternberg, a German botanist.



Fig. 234. Sternbergia lutea. (¼ nat. size.)

1. *S. lùtea* (fig. 234), syn. *Amarýllis lùtea.*—This is a valuable little plant for Autumn decoration. It is very hardy, and this, coupled with its bright yellow flowers, is sufficient recommendation for a late-flowering plant. The flowers appear with the leaves in September and October. South-west of Europe.

S. colchiciflòra, a native of Hungary, has a shorter scape, and the flowers are produced before the leaves.

Crìnum Capénse, syn. *C. longifòlium*, is a fine hardy South

African bulbous herb with long linear leaves and an umbellate flower-scape 2 to 3 feet high. Flowers large, fragrant, white tinged with rose, remarkable for their very long slender tube.

5. GALÁNTHUS.

The Snowdrop is too well known to call for detailed description. As a genus it is distinguished from *Leucòium* by having the three inner segments of the perianth shorter than the outer, and by the finely-pointed anthers opening at the top only. The name is from *γάλα*, milk, and *ἄνθος*, flower.

1. *G. nivàlis* (fig. 235). Snowdrop.—The only species of this genus in general cultivation. It is found throughout Central



Fig. 235. Galanthus nivalis. (½ nat. size.)

and Southern Europe to the Caucasus. In England it is supposed to be naturalized only.

G. Imperàti or *plicàtus* is a later-flowering larger species, from the South of Europe.

6. LEUCÒIUM.

The Snowflakes are almost as familiar as the Snowdrop. In this genus the segments of the perianth are almost or quite equal in length, and the anthers open by slits instead of pores. The name is from the Greek *λευκός*, white, and *ἴον*, a violet.

1. *L. vérnum.* Spring Snowflake.—Flowers, as its name denotes, in Spring. Scape 1 or rarely 2-flowered.

2. *L. æstivum* (fig. 236). Summer Snowflake.—This species flowers in July. This and the foregoing both resemble the Snowdrop, but they are taller in stature; and this has several-flowered scapes. Both are natives of Europe.



Fig. 236. Leucoium æstivum. (¼ nat. size.)

7. NARCÍSSUS.

Bulbous plants with all the leaves radical, linear and narrow. Scapes one or more flowered; flowers spathose, white or some shade of yellow. Perianth tubular below, with an appendage at the mouth called a crown or corona; segments spreading or reflexed. Stamens usually equalling the crown, filaments free or adnate to the perianth. Capsule coriaceous. The name of this genus is of mythological origin. The species and varieties are very numerous and somewhat difficult of discrimination. Mr. Baker's review of the genus in the 'Gardeners' Chronicle' for 1869 being the most useful guide to the species and varieties we are acquainted with, we reproduce that in an abridged form. He arranges them under three divisions, according to the size of the crown, viz:—

I. Magnicoronàtæ.—Crown as long or rather longer than the divisions of the perianth.

There are only three well-marked species belonging to this group, one of which is very rare in a wild state and hardly known in cultivation. They are distinguished as follows:—

Tube inversely conical, varying from as long to twice as long as broad, with the stamens from the bottom: divisions of the perianth more or less ascending.

Filaments and style curved; divisions of the perianth linear-lanceolate, a line to an eighth of an inch broad at the base 1. *N. Bulbocòdium.*
Filaments and style straight; divisions of the perianth oblong-lanceolate, 5 to 6 lines broad at the base 2. *N. Pseudo-Narcissus.*

Tube cylindrical, rather widened at the top, five or six times as long as broad; divisions of the perianth distinctly reflexed 3. *N. Calathínus.*

II. Mediocoronàtæ.—Crown half as long as the divisions, or sometimes three-quarters as long.

Of this group there are seven leading types, but two of these are not known in a wild state.

Divisions of the perianth distinctly reflexed . 4. *N. triándrus.*

Divisions of the perianth spreading at a right angle from the base of the crown.
Large-flowered; the divisions 9 to 12 lines long, and the corona 5 to 6 lines.
Divisions of the limb white.
Crown white, half as long as the divisions 5. *N. poculifórmis.*
Crown bright yellow, three-quarters as long as the divisions 6. ***N. Macleàii.***
Crown and limb both yellow.
Flowers always solitary; leaf 6 to 7 lines broad, glaucous 7. *N. incomparábilis.*
Flowers 1 or 2; leaf 3 to 4 lines broad, bright green 8. *N. odòrus.*
Small-flowered; the divisions 3 to 6 lines deep, and the crown half as long.
Divisions and limb bright yellow, leaf green, cylindrical 9. *N. juncifòlius.*
Divisions and limb white, leaf glaucous, flattish 10. *N. dùbius.*

III. Parvicoronàtæ.—Crown less than half as long as the divisions of the perianth.

Of this group we may define eleven leading types.

Limb of the flower horizontal, or nearly so, when expanded; anthers sessile or nearly so.
Flowering in Spring.
Crown cup-shaped, 2 to 4 lines deep, with its margin uniform with that of the limb.
Leaves glaucous, flattish, 6 to 8 lines broad 11. *N. Tazétta.*
Leaves sub-terete, green.
Flowers 1 or 2, nearly white, with a tube 12 to 14 lines long 12. *N. grácilis.*

Flowers 3 to 6, yellow, with a tube 8 to 9 lines long 13. *N. intermèdius.*
Crown obconical, uniform, not more than a line deep.
Flowers white; leaves flattish, glaucous, 3 to 4 lines broad 14. *N. pachybólbos.*
Flowers bright yellow; leaves terete, bright green 15. *N. Jonquílla.*
Crown obconical, 1 to 1½ line deep, the edge different in texture to the rest, and much crisped and crenulate.
Flowers in pairs; crown with a yellow rim 16. *N. biflòrus.*
Flowers solitary; crown with a scarlet rim 17. *N. poéticus.*
Flowering in Autumn.
Leaves contemporaneous with the flowers.
Divisions of the flowers greenish . . 18. *N. viridiflòrus.*
Divisions of the flowers white . . 19. *N. élegans.*
Leaves produced after the flowers . . 20. *N. serótinus.*
Limb of the flower campanulate; crown nearly obsolete; anthers shorter than their filaments . 21. *N. Broussonéttii.*

We have given the key in full in order to enable cultivators to identify their species; but we must limit ourselves to noticing more fully those only which are in general cultivation.

1. *N. Bulbocòdium.* Hoop Petticoat.—One of the commonest in cultivation, and almost universally known. It is about 4 to 8 inches high; scape 1-flowered; flowers not drooping, with a very short pedicel within the spathe; perianth gradually widening from the base upwards. Flowers bright yellow, appearing in April or May. A native of Southern Europe and North Africa.

This species constitutes the genus *Corbulària* of Haworth, and includes several more or less distinct varieties, some of which have been described as distinct species.

2. *N. Pseudo-Narcissus.* Daffodil or Lent Lily.—Usually about a foot high; scape flat, always 1-flowered; flowers yellow, with the crown of a darker tint. This is a common European plant from Sweden to the Mediterranean.

This forms the genus *Ajax* of Haworth, and is readily divided into five tolerably distinct forms. The ordinary *N. Pseudo-Narcissus*; *N. màjor*, larger in all its parts than the preceding, with all parts of the flower uniform in colour. Both of these

are very commonly seen double. *N. mìnor* (fig. 237), very much smaller than the type, with the leaves shorter than the scape, flowers uniform in colour; *N. bìcolor*, resembling the type in size, but with the crown of a bright yellow, and the



Fig. 237. Narcissus minor. (¼ nat. size.)

divisions of the limb pale sulphur-yellow; it also flowers later than the other varieties. *N. moschàtus* is a uniform coloured variety with large or medium flowers of a very pale yellow, becoming almost white.

3. *N. Calathìnus* is very distinct from the two foregoing, but is rarely seen in cultivation.

4. *N. triándrus* is a native of Spain, and there have been several varieties in cultivation, though they are rare now.

5. *N. poculifórmis.*—This has not been found growing wild, and is generally supposed to be a garden form, resulting from a cross between *N. dùbius* and *N. Pseudo-Narcíssus* var. *moschàtus*. It is perhaps better known as *N. montànus*. The flowers are pure white, drooping, and sweet-scented, appearing in April.

6. *N. Macleàii.*—Also of garden origin, resembling the *bicòlor* variety of *Pseudo-Narcíssus*, but with a smaller crown.

7. *N. incomparábilis.*—A native of Southern Europe, com-

mon in gardens, with two principal varieties. It is about the same size as the common Daffodil, but the crown is always shorter than in that species, even in the double flowers. *N. aurántius*, including *N. Gouàni* (fig. 238), is a robust variety with the crown orange, and the divisions of the perianth



Fig. 238. Narcissus Gouani. (¼ nat. size.)



Fig. 239. Narcissus odorus. (¼ nat. size.)

sulphur-yellow. Double-flowered forms are the Nonpareils and Butter-and-Eggs of English gardens. *N. albùs*, with paler divisions and an orange crown, produces a double form known as the Orange Phœnix.

8. *N. odòrus* (fig. 239).—A very distinct species approaching

the typical *N. incomparábilis*, but differing in its leaves being very concave, flowers bright yellow, very fragrant and rarely solitary. A native of the South of Europe.

9. *N. juncifòlius*, a very small plant with terete leaves and bright yellow flowers, from the South of Europe. It blooms in April.

10. *N. dùbius*, similar to the last, but having pure white flowers, not known in English gardens.

11. *N. Tazétta*.—This is the commonest of the several-flowered Daffodils, and is very prolific in forms. It is found in a wild state from the South of Europe, through Syria and North India, to China and Japan. It blooms in March or April, and has flattened scapes, with fragrant flowers. The forms are arranged by Mr. Baker in three series, characterised as follows: 1. Segments of the limb white, crown yellow; which includes *N. lácticolor*, *N. polyánthus*, *N. Mediterràneus*, and *N. ochroleùcus*. 2. Crown and segments of the limb both pure white; includes *N. papyràceus* and *N. Panizziànus*. 3. Crown and segments of the limb both yellow; contains *N. Itálicus*, *N. aùreus*, and *N. chrysánthus*.

12. *N. grácilis*.—A plant about a foot high with sub-terete leaves and yellowish or nearly white flowers, well known in cultivation, and supposed to be of hybrid origin.

13. *N. intermèdius*.—Is a native of Spain and the South of France. It has the same cup-shaped crown as the last two, differing from *Tazétta* in its sub-terete leaves, and from *grácilis* in its smaller flowers.

14. *N. pachybólbos* comes from Algeria, but does not appear to be in cultivation.

15. *N. Jonquílla*. Jonquil.—A native of the Mediterranean region. It has been confounded with *N. juncifòlius*, but it is much more robust in habit, with larger more numerous flowers, and a crown considerably shorter in proportion to the limb. The flowers are invariably of a beautiful bright yellow, and very fragrant. It is often seen with double flowers.

16. *N. biflòrus*.—A very common species with white flowers, having a yellow rim to the crown. It is often met with in a wild state in this country and on the Continent.

17. *N. poéticus* (fig. 240).—From the South of Europe, and one of the prettiest species of the genus, the flowers being pure white with a scarlet border to the crown. There are several

varieties, including *N. radiiflòrus* which is considered a distinct species by some botanists, *N. stellàris*, *N. recúrvus*, *N. poetàrum*, and *N. verbenénsis*, a very slender late variety.



Fig. 240. Narcissus poeticus. (¼ nat. size.)

18. *N. viridiflòrus*, a native of Spain and Barbary, having greenish flowers. This and 19, *N. élegans*, and 20, *N. serótinus*, are Autumn-flowering species, and may be distinguished by reference to the above key. 21. *N. Broussonéttii* is a rare plant from Mogadore, in which the crown is very slightly developed. It is not in cultivation, and is merely mentioned here to complete the list of known species.

8. PANCRÁTIUM.

A noble genus of bulbous herbs belonging to the group with a corona or cup at the mouth of the perianth. Leaves lorate, either deciduous or persistent. Flowers white, borne in umbels on the summit of a solid scape. Perianth-tube long, straight, slightly enlarged upwards; limb six-parted, spreading. Cup large, lobed, bearing six stamens between the lobes. The name is derived from the Greek words *πᾶν*, all, and *κρατύς*, powerful, from the reputed medicinal properties of the species. Two similar species are not uncommon in our gardens.

1. *P. marítimum.*—Leaves linear, persistent; flowers larger than in No. 2, and nearly sessile. From the Mediterranean region.

2. *P. Illýricum* (fig. 241).—Leaves broad, ligulate, deci-

duous, strongly veined. Flowers pedicellate, smaller, and with a shorter tube than in the preceding. Also from the Mediterranean region, though less widely dispersed. Both are hardy in the South of England, and flower in June.



Fig. 241. Pancratium Illyricum. (¼ nat. size.)

P. Caroliniànum and *P. rotàtum*, North American species, also white-flowered, are occasionally seen. The former closely resembles *P. marítimum*, and is sometimes united with it. The leaves are narrow, less acute, and not so intensely glaucous;

the latter is perhaps better known as *Hymenocállis rotàta*, differing from *Pancrătium* in the scarcely dilated perianth-tube, flattened scape, and other particulars.

9. ALSTRŒMÈRIA.

This genus belongs to a distinct section of the *Amaryllideæ*, the members of which, instead of having bulbs, have fleshy fibrous roots, something in the way of Asparagus. The genus under consideration, as well as some allied genera, belong more properly to the greenhouse; but there are nevertheless a few species almost, if not quite, hardy. They are tall handsome plants with true leafy stems and terminal umbels of gaily coloured flowers. Leaves usually linear or lanceolate and resupinate, or inverted in position by the twisting of the petiole. Perianth regular, 6-parted, campanulate, interior segments narrower, two of which are somewhat tubulose at the base. Stamens included within the perianth, and inserted with it. Stigma trifid; seeds numerous. All the species are from South America. Named in honour of Alströmer, a Swedish botanist.



Fig. 242. Alstrœmeria pelegrina. (½ nat. size.)

One of the handsomest and hardiest species is *A. aùrea*, also called *A. aurantìaca*. An erect plant about 3 feet high with lanceolate reversed obtuse leaves. Flowers numerous, in a terminal umbel, the outer perianth-segments orange-coloured, the inner narrower and also orange-coloured, but the two upper ones striped with red. *A. psittacìna* received its name in consequence of the upper petals being slightly hooded. The perianth-segments are of a bright crimson at the base, greenish upwards, spotted with purple. *A. pelegrìna* (fig. 242), from the Andes of Peru, has white or pale yellow flowers striped with rose, and yellow spot on each segment.

There are many other species and all are very beautiful.

10. BOMÀREA.

Is of close affinity with the preceding genus and from the same regions, differing mainly in the climbing habit and triangular seed-pod, which instead of splitting to the base opens at the top only. Some of the species possess about the same degree of hardiness as the hardiest Alstrœmerias. *B. Salsílla* (fig. 243) is a pretty twining plant with glabrous leaves and purple flowers about half an inch long, the two upper and inner segments having a darker spot at the base, and all of them tinged with green towards the points.



Fig. 243. Bomarea Salsilla. (½ nat. size.)

11. ÁGAVE.

A noble genus of succulent or fleshy-leaved plants with a tall branched inflorescence resembling a huge candelabrum. Perianth funnel-shaped, persistent, of six nearly equal divisions. Stamens exceeding the expanded perianth. The name is from the Greek *ἀγαυὸς*, in allusion to the stately habit of many species They are chiefly natives of Mexico and South America. The best known is *A. Americàna*, but this is only hardy in the south-western counties of England. It is almost stemless, with very massive fleshy spinose crowded leaves from 3 to 6 feet long, which are of many years' duration. It is essentially monocarpic, but it is usually many years before it reaches maturity. The inflorescence attains a height of 20 or 30 feet, bearing many hundreds of erect yellowish flowers. This plant is commonly known as the American Aloe, and is usually grown in tubs to admit of giving it shelter the more readily in Winter. It is exceedingly ornamental, and is a very striking object in a large garden, especially the variegated variety.

Order XI.—LILIÀCEÆ.

Herbs having bulbous, tuberous, rhizomatous or fibrous roots, or very rarely shrubs or trees. Leaves usually narrow, with parallel veins, rarely net-veined. Inflorescence various. Flowers usually showy and hermaphrodite. Perianth inferior; segments commonly 6, all alike, nearly free or united in a tube. Stamens 6, anthers turned inwards. Styles usually united to the top. Fruit superior, 3-celled, many-seeded, capsular or fleshy; seeds albuminous. This order furnishes a great proportion of the most brilliant of hardy petaloid monocotyledons. It contains about 100 genera and 1,500 species. The limits of this order are by no means satisfactorily defined, and this remark applies with still greater force in respect to genera and species. Some systematists include here the genera referred by others to orders bearing the names *Melanthàceæ*, *Smilàceæ*, *Trilliàceæ*, and *Philesiàceæ*. Those included in the two last-mentioned groups will be found placed at the end of this order.

1. ERYTHRÒNIUM.

Dwarf stemless herbs with scaly bulbs, radical ovate or ovate-lanceolate often spotted leaves, and solitary pendulous rather large flowers on a short scape. Perianth composed of 6 free similar erect or reflexed lanceolate segments. Stamens 6. Fruit a 3-celled capsule. About half-a-dozen species are known, natives of north temperate regions in both the Old and New Worlds. The generic name is from the Greek *ἐρυθρός*, red, the colour of the flowers in the European species.

1. *E. Dens-cànis.* Dog's-tooth Violet.—This is the common European species, an old and very beautiful border plant. It grows about 6 inches high and the foliage is blotched with purple-brown and white. Flowers about 2 inches in diameter, purplish-red, rosy, lilac or white, according to the variety. It blooms in March and April, and may be classed amongst the handsomest of early Spring flowers.

2. *E. Americànum.* Yellow Adder's-tongue.—A very similar plant with pale yellow flowers, produced in early Spring. The segments of the perianth are spreading, not distinctly reflexed as in the common species. A native of North America.

2. TÙLIPA.

Tulips as well as Roses and Carnations have always held a distinguished rank in floriculture, and ever since the sixteenth century they have been the flowers of predilection with the Belgians and Dutch, who have made them an object of considerable commercial importance. At that period the passion for Tulips was general, and with some it degenerated into a very expensive mania, for which reason they were termed Tulip-fools by their contemporaries. But time and especially the progress of floriculture have put an end to these eccentricities, and, although they have lost their ancient glory, Tulips still preserve something of their former prestige; and if men no longer ruin themselves on their account, they still number a great many admirers. The genus *Tùlipa* of botanists is so named from its Persian appellation *tuliban* or *thoulyban*, in allusion to its resemblance to the turban of the East. It is almost unnecessary to say that they are bulbous plants with simple one-flowered stems, whose flowers are composed of a coloured 6-leaved perianth, in two series of 3 each, 6 stamens, and a free ovary developing into a capsular 3-celled many-seeded fruit. The species, or natural varieties, are rather numerous, and at the same time very difficult to distinguish from one another. All the species belong to the Old World, and chiefly to the Mediterranean region and Western Asia. One species, *T. sylvéstris*, with yellow flowers, is found in the eastern counties of England, but there is some doubt of its being a true native. It does not appear, that the Tulip was known in Europe previous to the Crusades, and the name, of Eastern origin, seems to indicate at least that the first cultivated varieties were brought from Asia. We find nothing in Greek or Latin authors to lead us to suppose that the Tulip was known in their times.

The mode of vegetation of Tulips deserves an instant's attention from us. Their bulbs belong to the class termed tunicated, because they are composed of the fleshy bases of leaves closely imbricated, which are either developed or remain in a rudimentary state, the whole enveloped in thin membranous scales. In an adult Tulip we always find toward the end of Winter, but before the blooming time, three distinct bulbs, each belonging to a different generation, namely (1) the flowering bulb in the centre of which the flower-bud is already formed pre-

paratory to opening, and which also produces leaves; this bulb exhausts its juices according as the flower advances towards its end, and when that is reached, there is nothing left of it but the withered envelopes, which themselves soon decay and disappear: (2) the succeeding or replacing bulb, formed of very fleshy closely-packed scales, in the centre of which the leaves and flower-bud are in course of formation, and these are not fully developed till the following year; this bulb originates in the axil of one of the outer scales of the mature bulb; this, then, represents the second generation: (3) on one side of the last, and also in the axil of one of its outer scales, the bulb of the third generation already begins to show itself; it is fleshy and comparatively small, but enlarges in the course of the Summer. This would be the succession bulb of the following year, and would flower the third year, after having itself given birth to two generations of bulbs. The duration of each bulb is therefore three years, but it only flowers once. The Tulip is essentially monocarpic, and in the annual replanting, the bulbs which are confided to the ground are never those which have flowered in the Spring, but simply the succession bulbs which were produced the preceding season. Besides the succession bulbs, which are in a measure the continuation of the same individual, other bulbs are produced around the full-grown bulb, but smaller and of a different shape, which we might term propagating bulbs. These are the offsets, properly so called, destined to live a separate and independent existence, and become so many distinct individuals.

The botanist Kunth, in the first half of the present century, enumerated thirty species of Tulip; but subsequent authors are far from accepting that number, some increasing it and others restricting it. The consequence is a very much entangled synonymy, and it is now almost impossible to clear up the fundamental species. These great divergences of opinion are due in the first place to similarity of the species, and then their variability under cultivation, and lastly the facility with which they intercross to form hybrids or fertile mules. All these causes taken together explain the almost unlimited number of varieties that exist in a wild or cultivated state, and the almost imperceptible shades by which they pass from one into the other.

Mr. Baker estimates the cultivated species at seven, distinguished as follows:—

Stamens glabrous at the base.

Bulb-scales not woolly inside	1. *T. suavèolens.* *T. pubéscens* is a hybrid between 1 and 2. 2. *T. Gesneriàna.* 3. *T. Tùrcica.*
Bulb-scales woolly inside	4. *T. prœcox.* 5. *T. Oculus-sòlis.* 6. *T. Clusiàna.*
Stamens with a tuft of hairs at the base	7. *T. sylvéstris*, of which *Celsiàna*, *Gállica* and *Orphanídea* are varieties.

The natural colours in the Tulip are yellow, crimson, and violet of different hues, to which may be added white, which, however, is only a decoloration. They are either isolated or blended one with the other in the most diverse proportions, or they exist separately and distinctly in the same flower in the form of bands or spots. Under cultivation the original single flowers have produced semi-double and very double varieties, in which not only have the stamens become petaloid, but the number of the perianth-leaves has also been greatly increased. And then there are some double varieties with the perianth-leaves torn or fringed in the most curious and monstrous manner.

All the species and varieties of Tulips flourish under our climate and produce their flowers in early Spring, but not all at the same time. There are early and late and intermediate varieties, which permits of having them in bloom for a month or more, in a well-assorted collection.

The following are amongst the rarer cultivated forms: *T. sylvéstris*, with yellow flowers, and the only one found in Britain; *T. Gállica*, very similar to the preceding, but dwarfer and having smaller flowers; *T. Celsiàna*, from the Mediterranean region, with yellow or orange flowers tinted with red externally, but most likely only a variety of *T. sylvéstris*; *T. Oculus-sòlis*, a common European species, flowers scarlet or red having a black spot encircled with yellow at the base of each petal; and *T. prœcox*, perhaps a variety of the preceding, of tall and robust habit, with crimson flowers.

We now come to the species which have produced all or nearly all of the florist's varieties, so extensively employed in Spring gardening, and also for forcing in pots. First is *T. Gesneriàna* (fig. 244), a native of Western Siberia, and the parent

of innumerable varieties, both single and double, and variously coloured. It has tall slender stems, obtuse petals very often striped with white or yellow upon a violet ground, or *vice versâ*.



Fig. 244. Tulipa Gesneriana.
(¼ nat. size.)

T. suavèolens, the Sweet or Van Thol Tulip, has short stout stems, acute petals scarlet or gold-coloured, or the two colours combined. It is quite unknown as a wild plant, but its nearest allies are South European. *T. Túrcica*, or the Turkish Tulip, is a cultivated form of *T. Bithýnica*, a native of Asia Minor. The petals of this form are scarlet or yellow, and more lanceolate, and especially more acuminate, than in the two foregoing. *T. pubéscens* (Claramond, Brides of Haarlem, and other varieties) is a hybrid between *T. Gesneriàna* and *T. suavèolens*.

All Tulips are worthy of cultivation; but nevertheless we usually confine ourselves to those species and varieties which long culture has greatly improved, and which are the progeny of the species above enumerated. At least they are attributed to those three species, though we must remember that the primitive characters are so radically changed in many forms that it is exceedingly difficult to refer them to the one or the other; in fact, through intercrossing, the classification of certain varieties must remain purely arbitrary.

Gesner's Tulip is the oldest in our gardens, and by consequence the one upon which florists have exercised their powers to the greatest extent, resulting in the production of an unlimited number of varieties. The Van Thol Tulip is readily distinguished, when the specific type is not too much changed, by the shortness of its stem. It is besides three weeks or a month earlier, and may be forced much earlier. It includes single, semi-double, and very double varieties, self-coloured or margined with a colour diverse from the ground colour, assuming every tint from pure white and yellow to orange, purple, and violet. According to the botanist Fischer, it is common in the steppes of Russia, but this is extremely doubtful. The Van Thol Tulip undoubtedly holds the first rank in the genus of which it is a member. Less elegant in habit than Gesner's Tulip, it surpasses that in the greater distinctiveness of its varieties, in its hardiness, and in its adaptability to all purposes for which Tulips may be used. The Turkish Tulip is supposed to be the type of a group of large-flowered varieties opening very widely, and very brilliantly coloured scarlet and yellow, with fantastically fringed petals. Gardeners divide these again into several secondary groups. Some writers contend that these varieties are hybrids, the issue of crosses between *T. Túrcica* and *T. Gesneriàna*. It is far more probable that they are modifications of *T. Oculus-sòlis*, induced by cultivation, or perhaps produced spontaneously. But all forms of *T. Oculus-sòlis*, according to Mr. Baker, may be known by their densely woolly bulbs.

Gàgea is a small genus of dwarf bulbous herbs with linear radical leaves and umbellate or corymbose bracteate scapes of small yellow or greenish-yellow flowers. *G. lùtea*, Yellow Star of Bethlehem, is indigenous in Eastern Britain.

3. CALOCHÓRTUS.

A handsome group of North American bulbous plants rarely met with under cultivation. Bulbs tunicated, producing rigid ensiform leaves and an erect scape with showy flowers. Perianth deciduous, the three outer segments sepaloid, linear, and the three inner petaloid, much larger and broader, and bearded on the inside. From *καλός*, beautiful, and *χόρτος*, grass.

1. *C. Leichtlínii.*—A recent introduction from California. It is a dwarf plant with narrow glaucous incurved leaves and slender scapes 4 to 7 inches high, bearing large white flowers 2½ inches across, with a purple blotch on each of the inner segments.

C. venùstus, lilac, *C. élegans*, white, and *C. nítidus*, purple, from the same region, are all splendid plants.



Fig. 245.
Fritillaria imperialis.
(About ⅛ nat. size.)

4. CYCLOBÒTHRA.

Allied to *Calochórtus*, but all the perianth-segments are bearded within and provided with a honey-pit in the centre. Bulbs tunicated, producing erect leafy stems. Outer divisions of perianth about half as large as the inner. Also natives of North America. The name is a compound of *κύκλος*, a circle, and *βόθρος*, a pit, referring to the cavities above mentioned.

1. *C. lùtea.*—This species grows about a foot high with leek-like leaves and two or three terminal yellow flowers. Exterior segments of the perianth greenish, the inner yellow, bordered with purple hairs. The stem is often bulbiferous in the leaf-axils.

2. *C. purpùrea.*—A more showy plant about 2 feet high. Outer segments of the perianth green and purple outside and yellow within; the inner segments purple outside and yellow within. Both are natives of Mexico, and rather tender.

5. FRITILLÀRIA.

The affinity of this genus is mainly with *Lílium* itself, differing however in having a trifid style and six glands within and at the base of the perianth; hence the name, from the Latin *fritillus*, a dice-box. They are bulbous herbs with leafy stems and drooping axillary or terminal bell-shaped flowers. All are natives of the northern hemisphere, chiefly European and Asiatic, a few extending to North America.

1. *F. imperiàlis.* Crown Imperial (fig. 245).—This is sup-

posed to be of Turkish or Persian origin. It is one of the largest of the genus, having a leafy stem a yard or more high surmounted with a tuft of leaves or bracts, around and beneath which the flowers are disposed in a whorl. The flowers are about the size of ordinary Tulips, and vary in colour from yellow to crimson. It blooms in April, and is a very showy plant for mixed borders and among dwarf shrubs.

F. Pérsica is of the same habit with dull purple flowers. Another group has solitary terminal flowers, and to this belongs the Snake's-head, *F. Meleágris*, a native of England, but now rarely seen in a wild state. This species is about a foot high, with 3 or 4 lanceolate leaves and reddish flowers streaked or spotted with purple, but varying from white (*F. prǽcox* of gardens) and yellow to dark purple. Several other species are occasionally seen, but with nothing particular to recommend them for a small garden: *F. Pyrenàica*, dark purple, flowering in June; *F. latifòlia*, red, May—from the Caucasus; *F. Kamtchatkénsis* and *F. pallidiflòra*, from Siberia.

6. LĪLIUM.

Herbaceous plants with scaly bulbs, simple leafy stems branched only in the inflorescence, if at all, and large showy white, yellow, orange, carmine, or red and orange, often spotted or striped flowers. Perianth-segments free, erect, spreading, or reflexed, the three inner usually rather larger than the outer. Stamens 6, anthers on long slender filaments; pollen often orange or brown and very abundant. Fruit capsular, 3-celled and 3-valved; seeds numerous. Name from λείριον, a lily; or, according to some writers, from the Celtic *li*, white. The Lilies are all natives of the northern hemisphere, chiefly in temperate regions, a few only reaching the sub-tropical parts of Asia. Several of the species may be counted amongst the oldest and handsomest hardy plants in cultivation, and some of those of more recent introduction are truly gorgeous in the splendour of their flowers. Of late the cultivation of these plants has considerably revived, partly, doubtless, in consequence of the discovery of many fine new forms; and at the present time the number of species and varieties in our gardens is very great. Most of the wild forms are tolerably distinct, but the species are ill-defined, and there are now so many varieties of an intermediate character in cultivation that it is a difficult task to refer them to their respective species, and one upon which no

two writers would exactly agree. Some of these varieties are in all probability of hybrid origin, whilst the great majority are simply seed-variations. This genus has engaged the attention of several writers, and Mr. J. G. Baker published a synopsis of the species in the 'Gardener's Chronicle' of 1871, of which we avail ourselves in the following descriptions. We include the key in its entirety, as nearly all the species are in our gardens; but we must limit ourselves to details of those species known to be in cultivation. All the species flower in Summer or early Autumn.

Sub-genus Notholírion.—Bulbs tunicated; stigma with three subulate hooked lobes.

Stem stout, with 20 to 30 leaves crowded near the base *L.ròseum.*
Stem slender, with 6 to 8 scattered leaves . *L. Hóokeri.*

Sub-genus Eulílium.—Bulbs scaly; stigma with three short obtuse lobes.

1. *Eulírion.*—Filaments nearly parallel. Perianth-segments broadest above the middle, recurved only towards the tip.

Leaves on long petioles, cordate-ovate . . { *L. cordifòlium.* / *L. gigánteum.*

Leaves sessile, linear or oblanceolate.
Leaves always scattered irregularly on the stem.
Flower narrowed suddenly into a long tube . *L. longiflòrum.*
Flower narrowed gradually to the base.
Leaves 12 to 20. Flowers 5 to 9 inches long; segments 1½ to 2 inches broad . . . *L. Japónicum.*
Leaves 30 to 50. Flowers 3 to 5 inches long; segments an inch or less broad . . *L. Nepalénse.*
Leaves 60 to 100. Flowers 2 to 3 inches long; segments under an inch broad . . . *L. cándidum.*
Leaves in regular whorls *L. Washingtoniànum.*

2. *Archelírion.*—Filaments very divergent. Perianth-segments not erect, ovate-lanceolate, recurved from below the middle.

Leaves linear, sessile, with bulblets in their axils . *L. tigrìnum.*
Leaves lanceolate, shortly petiolate, without bulblets.
Lower leaves 1½ to 2 inches broad, 7- to 9-ribbed *L. speciòsum.*
Lower leaves 1 to 1¼ inch broad, 5- to 7-ribbed *L. auràtum.*

3. *Isolírion.*—Filaments slightly divergent. Perianth-segments erect, broadest at the middle, and spreading only above the middle.

Leaves usually in regular whorls.
Flowers 2 to 3 inches deep; segments distinctly clawed *L. Philadélphicum.*

Flowers $1\frac{1}{4}$ inch deep; segments not clawed *L. medeoloides.*
Leaves never in regular whorls.
Flowers red and yellow; segments 2 to 4 inches long, distinctly clawed.
Stem glabrous; leaf-axils never bulbiliferous *L. Catesbæi.*
Stem cottony; leaf-axils often bulbiliferous *L. bulbíferum.*
Flowers red and yellow; segments 1 to 2 inches long, without claws.
Leaves glabrous, linear *L. pulchéllum.*
Leaves pubescent, lanceolate *L. cóncolor.*
Flowers white, under an inch long . . . *L. lancifólium*

4. *Mártagon.*—Filaments very divergent. Perianth-segments drooping, recurved from near the base.

Leaves usually arranged in regular whorls.
Flowers dull purplish-red, or rarely white . *L. Mártagon.*
Flowers bright red, passing into yellow.
Style 6 lines long *L. maculàtum.*
Style 1 to 2 inches long *L. Canadénse.*
Leaves never arranged in regular whorls.
Leaves $\frac{1}{2}$ to 1 inch broad, 5- to 7-nerved.
Perianth-segments 2 to 3 inches long, reflexed only from above the middle . . . *L. monadélphum.*
Perianth-segments 1 to 2 inches long, reflexed from near the base.
Leaves thick in texture, ciliated.
Perianth-segments 6 to 9 lines broad . *L. Carniólicum.*
Perianth-segments about 3 lines broad . *L. Pónticum.*
Leaves thin in texture, not ciliated . . *L. polyphýllum.*
Leaves $1\frac{1}{2}$ to 3 lines broad, 3- to 5-nerved.
Perianth-segments $1\frac{1}{2}$ to 3 lines broad.
Leaves crowded, 50 to 80 on each stem.
Flowers bright red, not dotted . *L. Chalcedónicum.*
Flowers yellow, dotted *L. Pyrenàicum.*
Leaves not crowded, about 30 on each stem *L. callòsum.*
Perianth-segments 8 to 12 lines broad.
Leaves 60 to 100 on each stem . . . *L. testàceum.*
Leaves 20 to 30 on each stem . . . *L. Leichtlínii.*
Leaves 1 to $1\frac{1}{2}$ line broad, 1-nerved.
Stem $1\frac{1}{2}$ to 3 feet high, with 80 to 100 leaves *L. Pompònium.*
Stem a foot high, with 30 to 50 leaves . . *L. tenuifólium.*

1. *L. rùbrum*, including *L. Thomsoniànum.*—This is the only species in cultivation having a dense bulb enveloped in thin scarious coats like that of a Tulip. Stem stout, erect, glabrous. Leaves 20 to 30, crowded near the base of the stem, more

distant upwards, linear, flat, indistinctly 10- to 12-ribbed; lower ones about a foot long, diminishing in size upwards, and passing gradually into bracts. Flowers racemose, 12 to 18 or more in well-grown plants, rosy-lilac, from 3 to 4 inches broad when fully expanded, sub-erect. Pedicels sub-erect or spreading, less than one inch long. Perianth-segments oblanceolate, somewhat obtuse. Filaments equalling the perianth; anthers purple. A native of the Western Himalayas, and a very pretty species, but rather tender with us. The variety bearing the latter name has larger flowers.

L. Hóokeri, the only other species of this section, is not in cultivation. It is a native of the Sikkim Himalayas.

2. *L. gigánteum.*—This is remarkable for its tall stout stem from 5 to 10 feet high and large cordate leaves, the lower (or all) petiolate. Flowers sub-erect, 6 to 12 in each raceme, yellowish-white spotted with purple in the throat, odoriferous. Perianth funnel-shaped. Segments 5 to 6 inches long, naked at the base. Filaments shorter than the perianth, pollen yellow. A very showy species from the Himalayas, requiring slight protection in severe weather. Mr. Baker unites this as a sub-species with *L. cordifòlium*, a Japanese plant of somewhat smaller dimensions.



Fig. 246. Lilium longiflorum, var. eximium. (⅛ nat. size.)

3. *L. longiflòrum*, including *L. Wallichiànum*, *L. Neilghérricum*, and *L. exímium*, etc.—Stem 1 to 4 feet high or more, clothed with numerous scattered linear acute glabrous leaves, and surmounted by 1 to 4 pure white flowers 6 to 9 inches long, and suddenly narrowed into a long tube. Stamens shorter than the perianth; pollen yellow. Varieties bearing the above names are sufficiently distinct from a horticultural point of view. The variety *exímium*, syn. *Takesima* (fig. 246), grows from 2 to 4 feet, with usually from 2 to 4 flowers from 8 to

9 inches long. *L. longiflòrum* proper grows from 1 to 2 feet, has broader leaves and usually solitary flowers; and *L. Wallichiànum*, syn. *L. Japónicum* (of Don, not of Thunberg), is a distinct robust form attaining a height of 4 to 6 feet, and usually solitary very large yellowish-white sweet-scented flowers. *L. longiflòrum* and *L. exímium* are natives of Japan and China, and are hardier than the others, which are from the mountains of India.

4. *L. Japónicum*, Thunberg, syn. *L. odòrum*. — An erect glabrous species from 1 to 2 feet high with from 12 to 20 scattered oblanceolate 5- to 7-nerved spreading leaves narrowed towards the base, and 1 to 3 sub-erect flowers. Perianth 6 to 9 inches long, narrowed gradually to the base, pure white tinged with purple externally. Filaments shorter than the perianth; pollen reddish-yellow. A native of China and Japan. *L. Brównii* is probably a luxuriant form of this with the stem and flowers tinged with purple.

L. Nepalénse is an allied Indian species, and is very rare if still in gardens.

5. *L. cándidum* (fig. 247).—This is the common White Lily of our gardens, and one of the very oldest in cultivation. It grows from 4 to 6 feet high with several pearly-white flowers and yellow anthers. It is a native of the South of Europe, and hardy in this country. *L. peregrìnum* is considered to be a slender form of this with rather smaller flowers. There is a double-flowered variety, and another, called *striàtum*, has the flowers striped and spotted with purple. But the most remarkable, though more curious than beautiful, is



Fig. 247. Lilium candidum. (⅛ nat. size.)

spicàtum, in which the flowers are abortive and replaced by white petaloid bracts.

6. *L. Washingtoniànum.*—A very beautiful species of quite recent introduction. It grows about 3 to 5 feet high, and is distinguished from all others of this group by the short spreading lanceolate 1-nerved glabrous leaves being arranged in regular whorls of 10 or 12. Flowers slightly nodding, from 12 to 18 in a raceme, on long pedicels, white tinged with lilac or purple, very fragrant. A native of the western slopes of the Sierra Nevada range in California, and most likely quite hardy in Britain.



Fig. 248. Lilium tigrinum. (¼ nat. size.)

7. *L. tigrìnum*, syn. *L. speciòsum* (Andrews, not of Thunberg) (fig. 248).—The Tiger Lily is one of the most distinct, and after the White Lily the one most commonly seen. It is distinguished from the allied species by the purplish cottony stems; linear sessile 5- to 7-nerved leaves usually with round black bulblets in their axils. Flowers bright orange-red with purplish-black spots. A native of Japan and China, and quite hardy in this country. *L. Fortùnei* is a magnificent robust variety from 6 to 10 feet high and bearing from 30 to 40 flowers on each stem. There is also a handsome double-flowered variety in cultivation.

8. *L. speciòsum*, Thunberg, syn. *L. lancifòlium* of Paxton, not of Thunberg.—This beautiful species usually bears the latter name in gardens. Stem glabrous, from 1 to 3 feet high. Leaves ovate-lanceolate, shortly petiolate, 1½

to 2 inches broad, lower ones 7- to 9-ribbed. Flowers 4 to 6 inches in diameter, 3 to 6 or more, corymbose, on long suberect bracteate pedicels. Perianth-segments 3 to 5 inches long, spreading from the base, and more or less covered on the lower half inside with papillose tubercles. Filaments variable in length; pollen deep red or yellowish. As a cultivated plant it is very variable in the colour of its flowers—white spotted or tinged with carmine or rose, or wholly white. There are many named varieties, as *álbum*, *punctàtum*, *rùbrum*, etc. It is a native of Japan, and totally different from the true *L. lancifòlium*.

9. *L. auràtum*.—This is perhaps the most gorgeous of all the Lilies, and one of the greatest acquisitions of recent years. Its purplish stems rise to a height of 2 to 5 feet and they are clothed with lanceolate shortly petiolate 5- to 7-nerved glabrous leaves from 6 to 9 inches long. Flowers very large, from 6 to 10 inches in diameter, 3 to 6 or many more on each stem. Perianth-segments spreading, 5 to 7 inches long, papillose within below the middle. This species is very variable in the colouring of its flowers. In the original variety the petals are pure white with a yellow band down the centre and scattered carmine spots, but scarcely two seedling plants can be found exactly alike in the disposition of the colours. Japan.

L. Philadélphicum is a North American species with the leaves usually in distinct whorls and orange-red flowers spotted with purple. It is near *L. bulbíferum*, but the stems are never cottony and the perianth-segments are distinctly clawed. *L. medeoloìdes* is a Japanese species with whorled leaves and small reddish-yellow spotted flowers. *L. Catesbæi*, syn. *L. spectábile* of Salisbury, and *L. Caroliniànum* of Catesby, not of Michaux, is a tender North American species remarkable for the long slender claw of the perianth-segments. Flowers orange-red spotted with purple.

10. *L. bulbíferum*.—Under this we include several forms, all characterised by having scattered linear-lanceolate leaves, commonly bulbiliferous in their axils, and few erect flowers with distinctly clawed spreading not recurved perianth-segments. The true *L. bulbíferum* has cottony stems, bulbiliferous leaves, and reddish-yellow flowers. The sub-species *croìceum* (fig. 249), Orange Lily, differs in the upper leaves being destitute of bulblets, and the flowers of a more decided orange-colour, never scarlet or crimson. Both of these are

European forms. *L. Davùricum*, syn. *L. spectábile* of Link, and *L. Thunbergiànum*, are Asiatic forms. The latter is from Japan and common in gardens, and is distinguished by its broader foliage and larger scarcely spotted flowers. Besides the above extreme forms there is a host of intermediate varieties in cultivation differing chiefly in the size and colouring of the flowers: *vitellìnum*, *aurantìacum*, *hæmatochròum*, *atromaculàtum*, *atrosanguíneum*, and *venústum*, are some of them.



Fig. 249. Lilium bulbiferum, var. croceum. (¼ nat. size.)

L. pulchéllum is an elegant dwarf species from Eastern Siberia with glabrous linear leaves and very small bright scarlet slightly spotted flowers. *L. cóncolor*, including *L. Sinìcum*, is a Chinese species with pubescent lanceolate leaves and small bright red and yellow faintly spotted flowers. *L. lancifòlium* has small white flowers less than an inch long. It is a native of Japan, and has never been in cultivation in this country.

11. *L. Mártagon.*—This is another of the common old species. Stem 2 or 3 feet high, more or less pubescent, and often streaked with purple. Leaves mostly in regular whorls of 6 to 9, lanceolate-spathulate, lower ones from 3 to 5 inches long. Flowers in a loose raceme, drooping, purplish-red copiously spotted with black, or rarely white. Perianth-segments recurved from the base, the pubescent tips

almost touching the pedicel. Stamens widely spreading; pollen reddish. A native of Central and Southern Europe and Western Asia. *L. maculàtum* is a native of North-eastern Asia and North-western America. It is a glabrous plant with bright red flowers remarkable for the short style.

12. *L. Canadénse.*—Stem 1½ to 3 feet high. Leaves mostly whorled, 2 to 4 inches long, lanceolate, acute, glabrous. Flowers about 4 to 6, sub-umbellate on long drooping pedicels. Perianth-segments lanceolate, acute, about 1½ inch long, spreading but not reflexed. The flowers vary from bright red to pale yellow, and are more or less copiously spotted with purple-brown. *L. parviflòrum* is a variety in which the perianth-segments are reflexed. *L. Humbóldtii* is a taller-growing form with much larger orange-yellow carmine-spotted racemose flowers. *L. Wálkeri* and *L. Hartwégii* are also referred here by Mr. Baker, as is also *L. superbum*, a magnificent plant 4 to 6 feet high with more numerous longer leaves and larger flowers with very much reflexed segments. *L. Caroliniànum*, Michaux (*L. autumnàle* of Loddiges), is intermediate between the last and the typical *L. Canadénse.*

13. *L. monadélphum.*—Stem about 3 to 5 feet high, glabrous or slightly pubescent. Leaves scattered, numerous, 5- to 7-nerved, linear-lanceolate, the lower ones 3 to 4 inches long. Flowers pale yellow spotted with carmine; segments of the perianth reflexed from above the middle. Filaments connate at the base. *L. Szovitsiànum*, syn. *L. Cólchicum*, is very near this, and associated with it by Mr. Baker, but the filaments are quite free, and it is said to flower two months earlier than *L. monadélphum.* Both forms are from the Caucasus and quite hardy in this country.

14. *L. Carniólicum.*—Stem 2 to 3 feet high, stout, glabrous. Leaves scattered, linear-lanceolate, thick in texture and distinctly ciliated. Flowers about 4 to 6, pendulous, bright orange or scarlet. Perianth-segments 1½ to 2 inches long and 6 to 9 lines broad, reflexed from near the base. A handsome species from South-eastern Europe, rare in British gardens.

L. Pónticum, from Asia Minor, has much narrower perianth-segments; and *L. polyphýllum* is an Indian species of which little is known.

15. *L. Chalcedónicum* (fig. 250).—Stem erect, 2 to 3 feet high, densely clothed with short ascending or appressed 3- to 5-nerved slightly hairy leaves, the lower ones 2 to 3 inches long.

Flowers bright scarlet or yellow, not spotted. A very hardy species, native of the South of Europe, and long in cultivation.

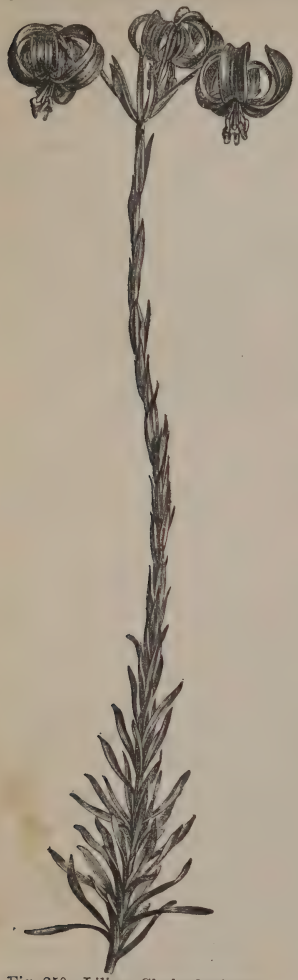


Fig. 250. Lilium Chalcedonicum. (¼ nat. size.)

16. *L. Pyrenàicum*, *L. flàvum*.—This species is very near the last and *L. Pompònium*, differing from the latter in its broader distinctly 3-nerved leaves less revolute at the margin, and from the former in its bright yellow spotted flowers. A native of the Pyrenees.

L. callòsum is remarkable for its indurated hood-shaped bracts. The leaves are few and distant, and the flowers bright scarlet with reflexed segments. Japan.

17. *L. testàceum*, syn. *L. excélsum*, *L. Isabellìnum*.—This is a distinct plant with a slender stem 5 to 6 feet high, and crowded ascending linear 3- to 5-nerved leaves ciliate on the margin and nerves beneath, the lower ones 3 to 4 inches long. Flowers 1 to 6 or more, on long pedicels in a thyrsoid raceme, nankeen yellow tinged with red. Perianth-segments 2½ to 3 inches long, 8 to 12 lines broad, united at the base, strongly reflexed and slightly papillose within. This is reported to be of hybrid origin between *L. cándidum* and *L. Chalcedónicum*, but nothing certain is known of its origin.

18. *L. Leichtlìnii*.—Stem rather slender, rising to a height of 2 or 3 feet, and rather loosely clothed with small linear slightly puberulous 3-nerved leaves. Flowers usually solitary or two together, bright yellow spotted with purplish red. Perianth-segments lanceolate, 2½ to 3 inches long, recurved from the base, hairy inside towards the base. This plant came up in a bed of *L. auràtum* at Messrs. Veitch's, and it is not known whether it be a wild Japanese species or of hybrid origin.

L. Maximowiczii, syn. *L. pseudo-tigrìnum*, is very near the last, but the stems are tinged with purple and somewhat cottony, and the ground colour of the flower is a brilliant scarlet. Japan?

19. *L. Pompònium*, syn. *L. angustifòlium*.—An old inhabitant of our gardens, and one of the prettiest of the moderate-sized species. It has an erect finely-furrowed rigid stem and very numerous short narrow 1-nerved linear leaves $1\frac{1}{2}$ to 2 lines broad in the middle, attenuated towards both ends and incurved at the margin. Flowers pendulous, 1 to 8, or usually more in cultivation, in a thyrsoid raceme, the lower pedicels 3 to 4 inches long. Perianth-segments lanceolate, reflexed from below the middle, hairy at the tip and slightly papillose within. Flowers more or less spotted with black on a scarlet, orange-scarlet, yellow or white ground. A native of Lombardy, Savoy, and neighbouring districts.

20. *L. tenuifòlium*, syn. *L. linifòlium*, *L. pùmilum*.—A very dwarf slender species from 6 to 12 inches high with numerous glabrous linear-subulate minutely-toothed leaves and 1 or 2 or more nodding flowers. Perianth-segments lanceolate-spathulate, 14 to 16 lines long, spreading from near the base and distinctly clawed, bright scarlet, rarely spotted. This very beautiful little plant is a native of Siberia and China.

7. HEMEROCÁLLIS.

Herbaceous plants from the temperate parts of Europe and Asia, with fleshy, tuberous, or bulbiform rhizomes and long narrow radical slightly equitant keeled leaves, from the centre of which rises a leafless flower-stem. Flowers in corymbs something similar to those of some Lilies, but differing from them in having the six leaves of the perianth united at the base into a narrow tube enclosing the free ovary; capsule several-seeded. Ἡμεροκαλλὶς is the Greek name of this genus of plants, and signifies 'beauty of a day' or 'ephemeral beauty' in allusion to the duration of the individual flowers. Hence also the English name Day Lily.

Two species of this genus are commonly cultivated, and are useful in planting in shrubberies or where large clumps are required; for though the individual flowers last but a day or two, they succeed one another for a considerable time. The flowering season is from June to August; and they are perfectly hardy.

1. *H. flàva.* Yellow Day Lily.—This differs from the following mainly in the colour of the fragrant flowers, and flat veinless perianth-leaves. South of France and other parts of Europe.

2. *H. fùlva* (fig. 251). Tawny Day Lily.—This has copper or tawny coloured inodorous flowers, rather larger than the preceding, with the perianth-leaves venous and wavy. *H. Kwánso* is a large garden form with double flowers. *H. dísticha* and *H. cròcea* are slight varieties.



Fig. 251. Hemerocallis fulva. (About ⅛ nat. size.)

H. mìnor, syn. *H. gramìnea*, *H. Dumortièri* and *H. Middendórfii* are smaller-growing species, natives of Siberia, China, and Japan. All of them have the three interior perianth-segments membranous at the margin. The first has very narrow leaves, long pedicels and perianth-tube; the second has leaves about six lines broad and a very short perianth-tube; and the third has leaves from 8 to 12 lines broad and a distinct perianth-tube about 4 lines long. All have yellow fragrant flowers.

8. FŪNCKIA.

Herbaceous plants with tuberous-fascicled roots, broadly ovate or cordate radical stalked plaited acuminate leaves having parallel veins or nerves, and sometimes variegated with white stripes. Flowers solitary in the axils of bracts, forming a raceme terminating the usually leafless stem. Several of the species have been published under the preceding genus, from which they differ in their broad foliage and racemose inflorescence. This genus was named in honour of H. Funck, a German botanist. The species are all from Japan. They are not so well defined as they might be, on account of the confusion among garden varieties, and the introduction of the same species under different names. Mr. Baker, in the 'Gardener's Chronicle,' 1868, reduces the cultivated forms to five species, distinguished as follows:—

1. *F. lancifòlia.*—Petiole 6 to 9 inches long, edges not incurved; lamina oblong-lanceolate, 3 to 4 inches long by 1½ to 2 inches broad, narrowed gradually towards both ends, 9- to 11-nerved. Scape or flower-stem 8 to 9 inches high, scarcely overtopping the leaves; raceme 3 to 5 inches long, 6- to 10-flowered, with lanceolate-spathulate bracts equalling the perianth in length. Perianth 1¼ to 1½ inch long, white or with a lilac tinge, dilated suddenly from a tube not more than a line in thickness. *F. albo-marginàta* barely differs in its rather larger flowers and leaves slightly variegated towards the edge with white. *F. undulàta* appears to be a cultivated form of this with frilled or crisped leaves copiously variegated with streaks or patches of white, and shorter dilated petioles.

2. *F. ovàta.*—Petiole 9 inches to a foot long, edges not incurved; lamina 6 or 7 inches long by 4 or 5 broad, ovate, rounded or slightly cordate at the base, acute at the apex, 15- to 17-nerved. Scape including the raceme considerably overtopping the leaves, with a large leaf below the raceme, which is 5 to 6 inches long and 10- to 15-flowered. Perianth typically a decided bluish-lilac, occasionally white, 2 to 2½ inches long, dilated suddenly from a tube an eighth of an inch in thickness. This is the commonest and best known species.

3. *F. Sieboldiàna.*—Petiole a foot long, edges not incurved; lamina 10 or 12 inches long by 6 or 7 broad, cordate-ovate, cuspidate, 25- to 27-nerved. Scape not overtopping the leaves;

raceme 8- to 12-flowered. Perianth 2 inches long, white with a pale lilac tinge, in shape like that of the last species.

4. *F. grandiflòra.*—Petiole a foot long, edges incurved until they meet; lamina 8 to 9 inches long by 4 to 5 broad, ovate with a slightly cordate base, 15- to 17-nerved. Scape about 2 feet high, sometimes bearing a well-developed leaf below the 12- to 15-flowered raceme. Perianth pure white, nearly 4 inches long, dilated gradually from a tube a quarter of an inch thick.

5. *F. subcordàta.*—Petiole 4 to 6 inches long, edges incurved and overlapping; lamina 4 to 5 inches long by 3 inches broad, ovate with a slightly cordate base, 13-nerved. Scape 1 to 1½ foot high, sometimes bearing a leaf; raceme 10- to 15-flowered. Perianth always pure white, about 4 inches long, gradually dilated from a tube a quarter of an inch in thickness.

9. AGAPÁNTHUS.

Herbs with tuberous roots and numerous radical linear somewhat fleshy leaves. Perianth funnel-shaped, regular, deeply 6-parted; tube short; segments 1-nerved. Stamens inserted in the throat, declinate, with slender filaments and versatile anthers. Flower-scape tall, naked, bearing a many-flowered umbel supported by an involucre of two bracts. The name is a compound of two Greek words: *ἀγάπη*, love, and *ἄνθος*, a flower. The species are all natives of the Cape of Good Hope, and require covering in Winter. Three have been described, viz.: *A. umbellàtus*, African Lily, the common one, having dark blue or occasionally white flowers; *A. præcox*, with light blue flowers, appearing rather earlier; and *A. mìnor*, a smaller form with light blue flowers. Possibly these are merely varieties of one species. There is also a variegated variety in cultivation.

10. KNIPHÒFIA (*Tritòma*).

A small genus of tufted herbs with numerous grass-like flaccid leaves and tall naked scapes surmounted by an oblong or ovoid dense cluster of brilliantly coloured clavate or cylindrical tubular slightly curved flowers with a very short scarcely spreading limb. Stamens hypogynous, usually exserted. Capsule few-seeded. A commemorative name. About half-a-dozen species are known, natives of South Africa.

1. *K. aloìdes*, syn. *K. uvària*, *Tritòma uvària.*—This stri-

kingly beautiful plant is quite hardy in the South of England, and admirably adapted for effective display in isolated clumps on lawns or amongst shrubs. It is certainly one of the most conspicuous ornaments of our gardens in Autumn. Leaves dark glossy green, minutely toothed or scabrid on the edges and midrib. The scapes are from 3 to 5 feet high, and the flowers a bright scarlet or orange-scarlet tipped with yellow.

K. Burchéllii differs in its spotted flower-scape and scarlet and yellow flowers tipped with green. *K. mèdia* and *K. pùmila* are quite similar, though smaller. None of the other species are at all common in gardens.

11. PHÓRMIUM.

A genus of plants confined to New Zealand and Norfolk Island. Though not quite hardy in any part of England, we give it a place here because it is extensively used and well adapted as a large pot-plant for decorating terraces, flights of steps, or planting out in clumps. Only two, or at the most three species are known, differing chiefly in size and colour of the flowers. They are tall rigid herbs with fleshy fibrous roots. Leaves radical, linear-ensiform, distichous, coriaceous, and very tough. Flower-scapes variable in height from 5 to 15 feet, branched and bracteate. Flowers large, dull red or yellow; perianth tubular, curved, the inner segments with spreading tips. The name is from the Greek *φορμός*, a basket, in allusion to the application of the leaves. The best known species is *P. ténax*, New Zealand Flax, a plant with very thick coriaceous narrow leaves from 3 to 6 feet long, dark green above, paler below, always split at the tip. Flowers numerous, in panicles, yellow or red. *P. Cookiànum* is distinguished from the foregoing by its smaller stature, greenish-yellow flowers, and especially by its more acuminate leaves, which are rarely split at the apex.

12. YŬCCA.

A genus of noble-looking plants, so distinct in appearance as to form in themselves a special feature in landscape gardening. They are mostly natives of the Southern States of North America and Mexico, and many of them are quite hardy in our gardens, where they are remarkable for their crowns of rigid flat ensiform leaves and large terminal panicles of white flowers. The stem is either short or almost obsolete, or, as in

Y. gloriòsa, several feet in height and more or less branched. The campanulate perianth is 6-parted, with the segments nearly equal in size, including 6 stamens whose filaments are dilated, becoming broader upwards. Ovary 3-celled, with 3 sessile stigmas. Capsule hexagonal, many-seeded. This genus, with the Aloes and two or three other genera, constitutes a well-marked tribe of the *Liliàceæ*. The name is its Peruvian appellation. Although there are perhaps a score or more of species in cultivation, only about six or eight with their varieties are generally known.

There are three tolerably distinct groups, founded on the characters of the leaves.

(1.) Margin of the adult leaves distinctly serrulate.

(2.) Margin of the leaves filamentose.

(3.) Margin of the leaves entire, neither filamentose nor serrulate.

To the first group belong two or three species which are not so hardy and do not flower so freely as the others.

1. *Y. aloifòlia*, having a thick stem which attains a height of 10 feet or more, and usually simple in this country on account of its not flowering. Leaves numerous, ascending, 18 to 24 inches long and about an inch broad, dark green or slightly glaucous, narrowed above the dilated base, with a hard reddish-brown point.

2. *Y. Treculeàna.*—A very distinct and handsome plant from Texas, not yet much known in England, though it has frequently flowered in France. It is also caulescent, and the fully developed leaves are from 3 to 4 feet long by 2 to 3 broad, dark green, strongly mucronate, and regularly serrulate.

The Filamentose series includes several of the hardier species of our gardens whose flowers in early Summer are by no means rare, a season seldom passing without producing them, even from quite young plants. Those commonly cultivated in the open air are all stemless.

3. *Y. filamentòsa.*—One of the most familiar species, popularly known as Adam's Needle-and-Thread. The leaves are very numerous, in a dense rosette, from a foot to 2 feet long and 1 to 2 inches broad, bright green, glaucous, slightly coriaceous, not sharp-pointed, spreading and at length reflexed. Scape 5 to 6 feet high, much branched; flowers numerous, about 2 inches deep. There is also a pretty variegated variety. *Y. strìcta* is very like this, but smaller in all its parts.

4. *Y. flàccida*, another well-known species similar to the last, but the leaves are of less substance, and when old abruptly turned back from the middle as if broken. The leaves too are longer and more copiously filiferous.

5. *Y. angustifòlia.*—A narrow-leaved small plant now rarely seen.

The Entire-leaved group contains the most conspicuous species of the genus.



Fig. 252. Yucca recurvifolia. (About $\frac{1}{10}$ nat. size.)

6. *Y. gloriòsa.*—This species has long been in cultivation and has produced several varieties. Stem 6 feet or more high, much branched; leaves numerous, crowded, 18 to 30 inches long and about 3 broad in the middle, narrowed towards both ends, erect, with a concave plicated face and sharp points.

Scape 3 to 4 feet high, much branched; flowers numerous, about 2 inches deep. The principal varieties are *glaucéscens*, like the type, but permanently glaucous; *oblíqua*, leaves and flowers smaller than in the type, the former more or less twisted to one side; *supérba*, leaves more rigid than in the type, panicle denser and hardly half as tall; and a variety with variegated foliage.

7. *Y. recurvifòlia* (fig. 252).—Stem dwarfer but more branched than in the preceding. Leaves more or less curved, not so concave and sharp-pointed as in *gloriòsa*. Panicle large and copiously branched. *Y. rufo-cíncta* is a variety of this species with a reddish-brown margin to the leaves.

8. *Y. acuminàta*.—This is perhaps an extreme form of *Y. gloriòsa* with a short stem and fewer leaves about 2 feet long, sharp-pointed, narrowed towards both ends, and brown or grey on the edge. Scape 3 to 4 feet high; flowers 2 inches deep.

13. ÁLLIUM.

Bulbous herbs with flat or terete radical leaves and capitate or umbellate flowers enclosed in a membranous spathe at the summit of a slender naked or leafy scape. Perianth-segments free, spreading or campanulate. Stamens equal in number, and on the bases of the perianth-segments. Capsule membranous, with one or two seeds in each of the three cells. The Latin name for *A. satìvum*, the Garlic. This is a large genus, including, besides the Onion and its useful congeners, several very ornamental and less fœtid species. Natives of the northern temperate regions of the Old and New Worlds.

1. *A. Móly*.—This species has broadly lanceolate glaucous leaves and large yellow flowers on a scape from 1 to 2 feet high. A native of the South of Europe, flowering in June.

2. *A.ròseum*.—A smaller plant with narrow lanceolate leaves and a leafy scape about a foot high bearing a large umbel of rosy-purple flowers in June.

There are several other species in cultivation, such as *A. odòrum*, with white; *A. azùreum*, deep blue; *A. suavèolens*, purple; and *A. flàvum*, yellow flowers.

14. CAMÁSSIA.

A North American genus of two species. *C. esculénta*, the Quamash of the Indians, is a handsome plant, resembling the common blue Hyacinth, but larger. The leaves are linear, about a foot high, and the flower-scape about 18 inches.

Perianth 6-partite, the five upper segments closer together, the sixth standing by itself. The raceme is pendulous and furnished with long bracts. The bulbs are edible and largely collected by the Indians of Colombia.

15. SCILLA.

This is a very extensive genus of beautiful bulbous herbs. Bulbs tunicated. Leaves all radical and linear. Flowers racemose, usually blue, rarely purple or white. Perianth-segments nearly or quite free, nerve of one rib. Stamens 6, perigynous; filaments not dilated. The classical name. *S. vérna* and *S. autumnàlis* are small species indigenous in the South-west of England, though very rare. The former bears bracteate racemes of bright blue fragrant flowers in April or May, and the latter bractless racemes of reddish-purple flowers in August or September.

Dr. Masters has recently investigated the early Spring Squills, and he ranges them under three species, as follows:—

1. *S. bifòlia.*—Bulb ovoid. Leaves 2 or 3, spreading, recurved, linear-lanceolate, channelled, terminating in a short blunt cylindrical point. Scape equalling or exceeding the leaves; bracts minute; pedicels spreading, lower ones longer than the upper ones. Flowers 5 or 6, blue; segments of the perianth oblong, obtuse, spreading. This includes several varieties differing in the colour of the flowers, as *ròsea*, *álba*, *cárnea*, etc.; and *S. pràecox* is an earlier-flowering form with larger flowers of a deeper blue than in the type. Russia to Greece.

2. *S. Sibírica.*—Bulb roundish. Leaves about four, flat, strap-shaped, slightly thickened at the point. Scape flattened, striated, scarcely so long as the leaves. Flowers 2 to 6, rarely solitary, on short pedicels, pale clear blue, more intense along the medial nerves of the segments. This includes the names *cérnua*, *uniflòra*, *azùrea*, *amœ̀nula*, etc. Asia Minor, etc.

3. *S. amœ̀na.*—Bulbs ovoid or roundish. Leaves numerous, spreading, strap-shaped, acute, and nearly a foot long, midrib prominent below. Scape erect, shorter than the leaves, compressed, striated, purplish upwards. Flowers 3 to 6, dark indigo blue, in a loose two-sided cluster. Segments of the perianth lanceolate, acute, midrib prominent. Filaments slightly dilated and whitish at the base, blue above. Ovary pale yellow. Central Europe and the Tyrol.

In the following the bracts are nearly as long as the pedicels.

4. *S. campanulàta* (*Endỳmion campanulàta*).—A South European species resembling our common Blue-bell. A large plant with leaves about a foot high and an inch wide. Scapes equalling the leaves. Flowers bell-shaped, variable in colour from deep blue and rose to white. South Europe, flowering in May.



Fig. 253. Scilla nutans. (½ nat. size.)

5. *S. nùtans* (fig. 253), syn. *Hyacínthus non-scríptus*. Blue-bell, Wild Hyacinth.—This is too well known to need description. It varies in colour like the last, though the prevailing colour is blue.

6. *S. Peruviàna*.—Named in error, being a native of South-western Europe. A much larger plant than any of the foregoing, 12 to 18 inches high, with broadly-linear ciliate leaves. Scape stout; flowers very numerous, deep blue. Stamens white; bracts solitary. May and June.

7. *S. Itálica*.—A similar but smaller plant than the last, with pale blue flowers having two bracts at the base of each pedicel. Leaves bright green, lanceolate. There is a white variety of this and the last.

16. ORNITHÓGALUM.

This genus differs from *Scílla* in having hypogynous stamens, and the nerve of the perianth-segments of more than one rib. And the flowers are either white or yellow, never blue or red. Dwarf bulbous

plants, the hardy ones chiefly from the Mediterranean region. Name from ὄρνις, a bird, and γάλα, milk; of obscure application. The following species are familiar, and the first three either naturalised or native in Britain.

1. *O. umbellàtum* (fig. 254). Star of Bethlehem.—This grows about a foot high, with concave leaves green with a



Fig. 254. Ornithogalum umbellatum. (½ nat. size.)

white stripe down the middle. Flowers white, numerous, umbellate, with slender pedicels and long bracts. May and June.

2. *O. Pyrenàicum.*—Flowers numerous, in racemes. Filaments dilated upwards. Perianth-segments greenish-white on the margin. June and July.

3. *nùtans.*—Flowers racemose, fewer than in the preceding, drooping. Filaments dilated upwards and trifid.

Perianth-segments white, with a green midrib. April and May.

4. *O. pyramidàle.*—A tall species about 2 feet high with linear flaccid leaves and dense racemose flowers. Flowers white, with a green stripe on each petal; bracts white. A native of the South of Europe, flowering in Summer.

O. aùreum is a beautiful South African species with long spikes of bright yellow flowers, but it requires slight protection in Winter.

17. MUSCÀRI.

A South European and Asiatic genus of bulbous herbs. Leaves appearing with the flowers; the latter in racemes, deep blue or white, or greenish blue, the terminal ones very often abortive. Perianth small, tubular, globose, often constricted at the mouth, with small reflexed lobes, segments more or less united. Stamens in two series, inserted in the tube of the perianth; filaments slender or dilated, scarcely exceeding the anthers. Capsule sessile, with 1 or 2 seeds in each cell. The name is from the Latin *moschus*, musk, in allusion to the smell of the flowers of some species. The name Grape Hyacinth is applied indiscriminately to any of the species.

1. *M. comòsum* var. *monstròsum.*—A very remarkable and abnormal plant in which the inflorescence is transformed into a dense tuft of slender ramifications of a dark violet-blue. Southern Europe. The normal variety is an unattractive plant and rarely grown.

2. *M. racemòsum.*—This has become naturalised in some parts of England. It is a dwarf plant with linear stiff fleshy leaves from 6 to 12 inches high. Scape rather shorter, with a dense terminal raceme of small dark-blue flowers ultimately changing to a reddish purple, and tipped with white in some varieties. It flowers in Spring.

3. *M. botryoìdes.*—This is one of the handsomest of the genus, growing about 8 or 10 inches high. Leaves linear, channelled, glaucous. Flowers in a very dense short spike, deep blue tipped with white, sky-blue and white, or wholly white. A native of Southern Europe flowering in Spring.

M. Heldreìchii is a very beautiful species with much larger flowers and linear flat leaves; *M. commutàtum* is near *M. racemòsum*, but the leaves are flaccid; *M. moschàtum* has very sweet-scented though small greenish-yellow flowers tinged with blue, or wholly blue; *M. lùteum* is a pretty species with large

fragrant flowers at first purplish, but changing to a pale yellow. They are all South European species.

18. HYACÍNTHUS (including *Bellevàlia*, etc.).

This genus contains about 30 species, chiefly from the Mediterranean region and South Africa. Few authors agree as to its limits, but for our purpose it may be characterised as follows: Flowers drooping, variable in number, disposed in loose leafless spikes; perianth-segments flat, united to about the middle and erect or recurved; stamens 6; filaments straight; anthers versatile. Capsule 3-celled, many-seeded. It differs from *Scílla* in the perianth-segments being united to the middle, whereas in the latter and its allies they are free or nearly so. The name is of mythological origin.



Fig. 255. Hyacinthus orientalis. (⅓ nat. size.)

1. *H. orientàlis* (fig. 255).—The species of paramount interest and the progenitor of all the beautiful varieties of our gardens and greenhouses. It is, as its name implies, a native of the East, and was introduced into Europe three or four centuries ago; but nowhere has it been cultivated with the same success as in Holland. Indeed, every gardener is familiar with the term 'Dutch bulbs,' of which the numerous varieties of the Hyacinth form a very important part. Hyacinths are chiefly exported from Haarlem. Upwards of 100 acres of land in the neighbourhood of this

town are annually devoted to the exclusive culture of these plants, and millions of bulbs are yearly sent to England, France, and Germany. This extraordinary success is due chiefly to the patient care which the Dutch expend upon them, and then the perfect suitability of the soil and climate —conditions not met with to the same degree elsewhere, and which probably will assure them the monopoly of this branch of floriculture for some time to come yet.

The nature of the soil in the vicinity of Haarlem and other parts appropriated to the culture of bulbous plants is quite peculiar. Situated at the base of the Dunes, which form a natural breakwater on the Dutch coast, it is composed like them of a deposit of sand mingled with alluvial mud. Besides which it is full of fresh water, which reaches it by infiltration, and appears at a depth of 3 to 6 feet according to the situation. This water rises to the roots of the plants by means of the capillarity of the soil, and just in proportion to their needs. On the other hand, this porosity of the soil allows the rain-water to escape freely. These conditions, coupled with a mild climate and cloudy sky, are eminently favourable to the growth and flowering of this class of plants, and are almost unattainable out of the Netherlands.

The extent of variation in Hyacinths is almost unlimited in the colour, size, doubleness, and odour of the flowers. White, cream, flesh, pink, rose, lilac, bright red, carmine, crimson, purple, violet, slate, gray, and blue of various shades to nearly black, are found both in the single and double varieties; and either more or less fragrant or quite scentless. There are also striped and shaded varieties, and some of the white ones have a purple, red, violet or yellow eye. A list of even the best varieties of the present time would be of so little service in a year or two that we prefer retaining the space it would occupy, especially as good descriptive catalogues are annually published by all the leading florists. They rank amongst the best of hardy bulbs for embellishing the borders and beds in Spring, as they retain their beauty for a long period.

H. amethystìnus is a pretty little species from the South of Europe with loose spikes of smaller bright blue flowers on slender pedicels, and linear leaves equalling or exceeding the flower-scape. It is quite hardy and flowers in April and May. It is sometimes called the Spanish Hyacinth.

H. Romànus, syn. *Bellevàlia operculàta*, etc., Roman

Hyacinth, with white or pale blue flowers, although hardy, is chiefly employed for early forcing. It is from the Mediterranean countries.

Puschkinia scilloïdes is a dwarf Spring-flowering bulbous herb about 6 inches high with linear-lanceolate leaves and a loose spike of campanulate white- and blue-striped flowers. Perianth-segments oblong, united at the base into a short tube. Filaments united to very near the top. Native of Southern Russia.

19. TRITELÉIA.

Very pretty little bulbous plants from North and South temperate America, lately united with *Milla*, having narrow leaves

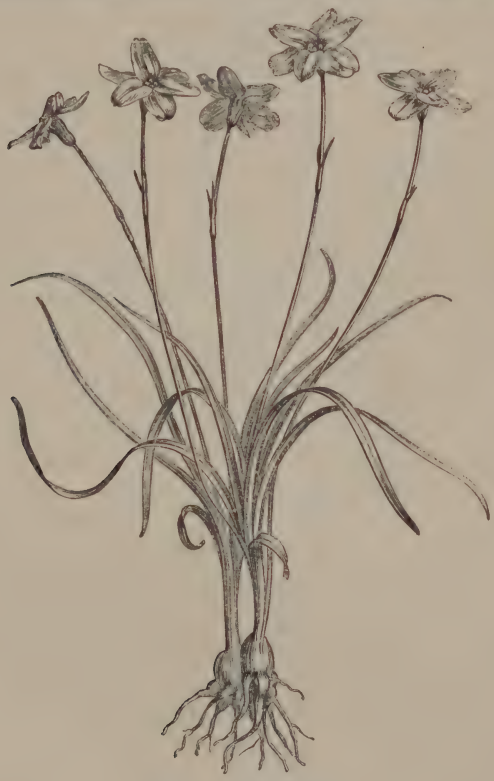


Fig. 256. Triteleia uniflora.

contemporaneous with the umbellate or solitary flowers. Perianth-tube funnel-shaped, the segments equalling or rarely exceeding it in length. Stamens inserted on the tube in two

distinct rows. Name from τρεῖς, three, and τέλειος, complete, from the ternary arrangement of the parts of the flower.

1. *T. uniflòra* (fig. 256).—The most familiar species, a native of South America. A small hardy bulb from 6 to 12 inches high, producing large tufts of linear somewhat fleshy leaves and numerous scapes bearing solitary terminal pure white or lilac-blue flowers in June or July.

T. grandiflòra, a Californian plant, less commonly seen, has white flowers; and *T. aùrea*, from Monte Video, is a smaller plant with filiform fleshy leaves and yellow flowers.

20. HESPEROSCÓRDIUM.

A closely allied North American genus or sub-genus with a campanulate perianth whose tube is three or four times as long as the segments of the limb. *H. hyacinthìnum* has fleshy herbaceous narrow leaves about a foot long, and flowers in umbels at the summit of a scape. Flowers blue or white, 10 to 30 in an umbel; umbel with an involucre of numerous small bracts.

21. CUMMÍNGIA.

A small genus of Chilian bulbous plants with linear nervose leaves and branched scapes of drooping blue flowers. Perianth campanulate, adhering to the base of the ovary; limb 6-parted, with spreading segments. Stamens inserted in the tube of the perianth; filaments compressed. In honour of Lady Gordon Cumming.

1. *C. trimaculàta.*—This has deep blue flowers with a dark purple spot on each segment.

22. ASPHÓDELUS.

A distinct genus of plants with fleshy fasciculated roots, usually radical tufted narrow or triquetrous leaves, and showy yellow or white flowers. Perianth of 6 free equal spreading segments. Stamens 6, hypogynous, alternately long and short. Natives of the South of Europe. Name said to be derived from ἀ, not, and σφάλλω, to supplant, in allusion to the handsome flowers.

1. *A. lùteus.* King's Spear.—This is perhaps the handsomest and at the same time the best known species. Stem leafy, about 3 or 4 feet high. Leaves small, triangular, pointed, dark green, marked with lines of a paler tint. Flowers in

erect dense racemes of a bright yellow, appearing from May to July.

2. *A. ramòsus.*—Stem much branched, 4 or 5 feet high, leafless. Leaves sharply keeled below, channelled above, nearly 2 feet long. Racemes numerous, loose; flowers white with a reddish stripe on each segment. May to July.

3. *A. fistulòsus.*—A very distinct species with a leafless stem about three feet high, and tufted fistular leaves, and white less conspicuous flowers. May to July.

23. ANTHÉRICUM.

A pretty genus of white-flowered herbs with fleshy fasciculated roots, natives of Europe. The name is said to be derived from *ἄνθος*, a flower, and *ἔρκος*, a hedge, but the application is obscure. The limits of this genus have been variously defined by different authors. It belongs to the capsular group, and the perianth-segments either spread from near the base, or they are campanulately united, and the short stamens have naked or bearded filaments. Seeds numerous.

1. *A. Liliàgo*, syn. *Phalángium Liliàgo.* St. Bernard's Lily.—Leaves tufted, narrow, channelled, 12 to 18 inches high. Scape usually simple; flowers pure white, small; perianth-segments spreading; style curved. May and June.

2. *A. Liliàstrum* (*Czáckia*). St. Bruno's Lily.—The sweet-scented flowers are larger in this species, and campanulate, and the leaves not channelled. A very beautiful plant with a simple flower-scape about the same height as the last. July and August.

3. *A. ramòsum.*—This species has long narrow channelled leaves shorter than the scape, like No. 1, but the inflorescence is branched and attains a height of 2 feet or more. Perianth-segments narrow and spreading, style straight. June and July.

24. CHRYSOBÁCTRON.

Closely allied to the foregoing genus and sometimes united with it. The name is from *χρυσός*, gold, and *βακτηρία*, a wand, from the splendid spikes of golden flowers. Natives of New Zealand.

1. *Ch. Róssii.*—A magnificent plant 2 to 3 feet high, with immense spikes of unisexual flowers.

Ch. Hóokeri is a similar though much smaller species with bisexual flowers. Both are very rare in collections.

25. ASPÁRAGUS.

Erect or climbing herbs or shrubs with minute scale-like leaves and numerous very slender fascicled acicular branchlets sometimes spiny. Flowers axillary, small and inconspicuous, on jointed pedicels. Fruit baccate. The elegant plumose branches of the esculent Asparagus, *A. officinàlis*, render this species almost indispensable in floral decorations, though it is seldom seen out of the kitchen garden. *A. tenuifòlius*, perhaps a variety of the foregoing, has still slenderer branchlets and a much shorter perianth-tube. *A. Broussonètii* is a climbing spiny species, from the Canary Islands, having red berries similar to those of the above. There are upwards of fifty other species in temperate Europe and Asia and the tropics of Africa and Asia. The name is of Greek origin, applied by the ancients to the edible species.

26. CORDYLÎNE.

This elegant genus of Palm-like plants, though none are hardy, deserves mentioning here as the species are now extensively employed in Summer decorative gardening. They are erect usually unbranched trees, bearing a tuft of long narrow drooping leaves at the summit of the trunk, which in some species attains a height of 30 or 40 feet. Flowers white, small, in branched panicles, and rarely produced on young plants such as are usually seen in gardens. Fruit baccate, few-seeded. Name from κορδύλη, a club. The hardiest species are those from New Zealand, of which *C. austràlis* with narrow leaves, and *C. indivìsa* with broad leaves, are the commonest. There are numerous other species in cultivation, frequently under the name *Dracæna*.

27. CONVALLÀRIA.

This genus is limited to the following species, distinguished amongst the baccate genera by its leafless flower-scape and globose flowers. The name is from the Latin *convallis*, a valley, the natural habitat of this plant.

1. *C. màjalis.* Lily-of-the-Valley (fig. 257).—This is so universally known as to render a description almost superfluous. Its delicate white exquisitely scented flowers and bright green foliage are known by almost everybody; and the demand for it is so great that it is not only cultivated in the open ground, but forced in pots, and may be procured at our

flower markets nearly all through the Winter. Under cultivation it has produced a double-flowered and a pink variety, and



Fig. 257. Convallaria majalis. (½ nat. size.)

another with handsome variegated foliage. It is a native of England, and Europe and Northern Asia generally. It flowers naturally in the month of May with us.

28. POLYGONÀTUM.

Similar in structure, but differing considerably in habit from the above genus. Instead of the leafless flower-scape and radical leaves, we have here a leafy stem and axillary flowers. Rootstock creeping. Leaves alternate, opposite or whorled. Flowers solitary or racemose, pendulous, white green or purplish, destitute of bracts. Perianth tubular or sub-campanulate. Stamens on the middle of the tube, included. Fruit a 2- to 4-seeded berry. The name is from *πολύς*, many, and *γόνυ*, a

knee, in allusion to the many joints or nodes. Natives of the temperate regions of the northern hemisphere. The three below enumerated are all found in Britain, and flower from May to July.

1. *P. multiflòrum.* Solomon's Seal.—Stem 2 or 3 feet high, terete. Leaves alternate, 3 to 5 inches long, with very short petioles, oblong, clasping the stem. Peduncles 2- to 5-flowered. Perianth about 8 lines long, constricted in the middle, greenish white. Filaments pubescent. Berry bluish-black. A very pretty border plant.

2. *P. verticillàtum.* — Stem 2 or 3 feet high, angular. Leaves whorled, sessile, lanceolate. Flowers rather smaller than in the preceding, greenish. Perianth constricted in the middle. Peduncles 1- to 3-flowered. Berry red.

3. *P. officinàle.*—Stem about a foot high, angular. Leaves alternate, oblong, semi-amplexicaul. Perianth constricted at the base; filaments glabrous. Berry dark violet.

Maiánthemum bifòlium, syn. *Smilacìna bifòlia*, is a diminutive allied plant with a bifoliate stem and small racemose flowers. It is a scarce plant in Yorkshire, etc., in England, but widely distributed in the north temperate zone.

29. RŬSCUS.

A peculiar genus of evergreen shrubs belonging to the Asparagus group. Flowers imperfectly diœcious. Perianth six-parted to the base, persistent. Fruit a berry. Name of uncertain origin. There are several species, some of them remarkable on account of the reduced leaves and flattened branches (*cladodes*), on whose face or margin the flowers are produced.

1. *R. aculeàtus.* Butcher's Broom.—A dwarf much-branched shrub with small ovate rigid spinescent cladodes bearing the small greenish flowers, which appear in April, and are succeeded by bright red berries about the size of a pea. A native of the South and West of England, etc.

2. *R. racemòsus.*—This is the species most frequently seen in gardens. It has larger glossy dark green lanceolate cladodes and terminal racemes of small flowers. Portugal.

R. andrógynus is a climbing plant from the Canaries, with flowers on the edges of the cladodes. *R. Hypoglóssum*, a South European species, has the flowers on the upper side of the

cladode with a smaller cladode overhanging them; and *R. hypophýllum*, also from the South of Europe, with the flowers beneath the cladodes. These three species are rare in gardens, and rather tender.

30. ASPIDÍSTRA.

Plants of fine foliage and insignificant flowers produced close to the ground, and remarkable for the curious Mushroom-like stigma. Name from *ἀσπιδίσεον*, a little shield, in allusion to this character, which is common to a small tribe of this family. Natives of Japan and China. *A. elàtior variegàta* is a stemless handsome plant with large oblong leaves on long petioles, alternately striped green and white, reaching a height of two or three feet. *A. lùrida* and *A. púnctata* are closely allied species.

Páris quadrifòlia is a closely allied native plant with one whorl of oblong leaves and solitary terminal yellow and green flowers.

31. TRÍLLIUM.

A singular North American genus remarkable for the ternary arrangement of the organs, all the species having the net-veined leaves in verticils of threes, the perianth in two distinct series, the outer sepaloid and persistent and the inner petaloid and fugacious, 3 or 6 stamens and 3 stigmas and a 3-celled fruit. This genus and its allies are referred by some writers to *Smilacìneæ*, whilst others regard them as a tribe of the *Liliàceæ*. The name is from the Latin *trilix*, triple. Two or three tuberous-rooted species are in cultivation, but they are seldom seen.

1. *T. grandiflòrum.*—A very beautiful plant about a foot high with ovate strongly-nerved leaves and solitary terminal pedunculate flowers. Outer segments of the perianth green, and the inner ones white.

2. *T. péndulum*, syn. *T. eréctum*. Birthroot.—This differs mainly from the last in the rounded base of the leaves, which are abruptly acute. The flowers are violet in the type, but there is a white-flowered variety.

32. PHILÈSIA.

A genus differing in its shrubby habit and some other particulars from all other plants of this family, and by some

authors separated from it, and considered, with the genus *Lapagèria*, as forming a distinct family near the *Smilacìneæ*. The genus is distinguished by its shrubby not-climbing habit, penninerved leaves, the three outer leaves of the perianth very much smaller than the inner, and monadelphous stamens. The name is from the Greek φιλήσιος, lovely.

1. *Ph. buxifòlia.* The only species known, a dwarf shrub with small leaves and large bell-shaped drooping flowers of a beautiful bright red. Native of South America from Valdivia to the Straits of Magelhaen. Hardy in the vicinity of the sea in the south-western counties of England.

Lapagèria ròsea, from the same region, is perhaps not quite so hardy. This handsome climber has 5-nerved leaves and large fleshy campanulate deep rose or white flowers.

Messrs. Veitch, of Chelsea, have recently succeeded in raising a hybrid between the two foregoing plants, possessing some of the characters peculiar to each of the parents. Dr. Masters has named this hybrid *Philagèria Veìtchii*, and observes that it is hardly equal in point of beauty to either of its progenitors.

Order XII.—SMILACINEÆ.

Herbs or shrubs, usually of climbing or trailing habit, and often furnished with tendrils and thorns. Leaves simple, alternate, distinctly petiolate, net-veined and usually ribbed. Flowers small, green or yellowish green, hermaphrodite or unisexual, generally in axillary clusters or umbels, rarely solitary. Perianth inferior, six-partite, segments similar. Stamens 6. Fruit superior, baccate, 1- to 3-celled, 1- to 3-seeded. There are two or three genera, comprising upwards of 100 species, chiefly belonging to the following genus and widely dispersed in temperate and tropical regions.

1. SMÌLAX.

Characters of the order. The name is of classic origin, and was applied to the South European species. None of them are very ornamental, but several species are valued for their medicinal properties. The various kinds of Sarsaparilla are produced by this genus.

1. *S. áspera.*—This is a South European species of trailing habit with prickly stems and ovate or lanceolate-cordate spiny-

toothed persistent coriaceous 7- to 9-ribbed leaves. Berries red.

S. Mauritànica, from the same region, has larger unarmed leaves.

Tàmus commùnis, Black Bryony, is an indigenous climber producing annual stems from a large tuberous rootstock, cordate-ovate glossy ribbed leaves, and inconspicuous unisexual flowers followed by clusters of oblong scarlet berries. It belongs to the *Dioscòreæ*, distinguished from the above family by having an inferior several-seeded fruit, etc.

Order XIII.—MELANTHÀCEÆ.

This group of genera is separated from the *Liliàceæ* by its extrorse anthers and the septicidal dehiscence of its capsular fruit. It includes bulbous, tuberous, and fibrous-rooted herbs with narrow or broad foliage and showy or inconspicuous flowers. The genera *Cólchicum* and *Bulbocòdium* closely resemble the Crocuses in appearance. *Narthècium ossífragum*, Bog Asphodel, an indigenous bog plant, associated with these plants when they are included as a tribe of the *Liliàceæ*, has a loculicidally 3-valved capsule. It has short stiff linear-nerved leaves and bright yellow racemose flowers, appearing in Summer. About 30 genera and 100 species are referred to this order.

1. VERÀTRUM.

Herbaceous plants with creeping rootstocks, broad conspicuously-nerved leaves, and branched panicles of numerous polygamous flowers. Perianth of six spreading lobes united at the base into a short tube. Name from *vere*, truly, and *atrum*, black, the colour of the roots.

1. *V. álbum.* White Hellebore.—A tall branching plant with ovate or elliptical-ribbed and plaited leaves. Flowers small but numerous, greenish white. An effective plant, native of Central and Southern Europe, flowering in August.

2. *V. nìgrum.* Black Hellebore.—A larger and finer plant than the preceding, with purplish flowers. A native of the same region.

Helònias bullàta, syn. *H. latifòlia*, is a showy bog plant from North America with oblong-spathulate radical leaves from a tuberous rootstock, and small scapose purplish flowers.

2. UVULÀRIA.

Dwarf fibrous-rooted herbs with sessile or clasping ovate-lanceolate cauline leaves and solitary or geminate pedunculate pendulous yellow flowers. Perianth-segments free to the base, linear-lanceolate or spathulate, slightly spreading. Fruit capsular, few-seeded. A small genus from North America and the mountains of Northern India. The name is from *uvula*, said to be applied on account of their medicinal use in diseases of that organ. It has also been explained as referring to the pendent flowers.

1. *U. grandiflòra.*—This species grows about a foot high, and the oblong-ovate slightly hairy leaves are perfoliate. Flowers pale yellow, 1½ to 2 inches long, appearing in May or June. North America.

U. pubérula and *U. sessilifòlia* have sessile not-perfoliate leaves and pale yellow or cream-coloured flowers; and *U. perfoliàta* is near *grandiflòra*, but with smaller flowers.

3. TRICÝRTIS.

A small genus of Chinese and Japanese origin. Erect hairy herbs. Leaves alternate, ovate or cordate, and stem-clasping. Flowers in terminal panicles. Perianth six-parted, the segments forming a ball, clawed, the three outer bulging at the base. From *τριάς*, three, and *κυρτός*, swollen or hump-backed, referring to the outer perianth-lobes.



Fig. 258. Bulbocodium vernum. (¼ nat. size.)

1. *T. hírta.*—A hardy plant with broad sessile ovate-acuminate shining nervose leaves. Flowers large, in terminal umbels, white thickly spotted with purple.

4. BULBOCÒDIUM.

A genus resembling *Cròcus* in general habit and aspect, but differing botanically in having a superior ovary and six stamens. The bulbs differ in the downy not fibrous nature of their coatings; the name is derived from *βολβός*, a bulb, and *κώδιον*, a fleece, in allusion to this character.

1. *B. vérnum* (fig. 258).—Flowers violet-purple, appearing in early Spring before the leaves are developed, not more than 2 or 3 inches high. Leaves ultimately 6 to 9 inches long. This is still a rare plant in gardens. It is a native of mountain pastures of Central Europe.

5. CÓLCHICUM.

A small genus of Autumn-flowering bulbous herbs allied to the preceding genus. Leaves not appearing till Spring, larger and broader than in *Cròcus* or *Bulbocòdium*. The ovary is underground, and is not visible until borne aloft by the growing leaves in Spring. The ancient Greek name.

1. *C. autumnàle*. Meadow Saffron.—A native of many parts of England, though nowhere very abundant. Flowers usually pale purple, but there are variously-striped varieties and also a white variety in cultivation. This is sometimes called Autumn Crocus, from its resemblance; but besides its technical characters, the long flat leaves are sufficient to distinguish it from that genus. It furnishes the drug of the same name.

Order XIV.—PONTEDERÀCEÆ.

A small order of aquatic or semi-aquatic plants with broad leaves and solitary racemose or spicate flowers. Perianth funnel-shaped, circinate when withering. Anthers turned inwards. Fruit capsular, dehiscing loculicidally.

1. PONTEDÈRIA.

A small genus of pretty aquatic plants with creeping rhizomes and long-stalked oblong or cordate leaves, and one-leaved stems terminated by a raceme of blue flowers. Perianth somewhat two-lipped. Stamens 6, the upper 3 often sterile. Ovary 3-celled, two cells abortive and the other 1-seeded. Named after an Italian botanist. Natives of America.

1. *P. cordàta* (fig. 259). Pickerel-weed.—A common North American plant, 1 to 2 feet high, desirable for the hardy aquarium. *P. angustifòlia* is a variety with narrow lanceolate leaves cordate at the base, and also smaller bright blue flowers.

These plants should be placed in 2 or 3 feet of water, or they will not bear our winters.



Fig. 259. Pontederia cordata. (¼ nat. size.)

Order XV.—COMMELYNÀCEÆ.

Herbs with linear or lanceolate flat usually sheathing leaves and solitary spicate or umbellate flowers. Perianth-segments 6, the outer 3 herbaceous, inner petaloid. Stamens 6 or fewer. Fruit a 2- or 3-celled few-seeded dehiscent capsule. There are about 20 genera and 250 species, with the exception of those enumerated below, nearly all tropical.

1. TRADESCÁNTIA.

Herbaceous tufted or creeping plants. Stem branched, fleshy, 1 to 2 feet high. Leaves entire, linear-lanceolate, sheathing, glabrous. Flowers in terminal sessile or stalked umbels. Perianth 6-parted, the 3 exterior sepaloid, and the 3 interior petaloid. Filaments bearded. An American genus, named in remembrance of Tradescant, gardener to Charles I.

1. *T. Virgínica.* Spiderwort.—A very pretty and interesting plant growing about a foot and a half high, with linear-lanceolate acuminate glabrous ciliate sheathing leaves and sessile bracteate umbels. Outer perianth-segments green, inner rosy-purple. Filaments densely bearded with long spreading jointed purple hairs. There are several varieties, including one with white petals and purple filaments, another with beautiful rose-coloured petals, and also a double-flowered variety.

2. *T. ròsea.*—A similar though smaller and less hardy plant,

from Carolina, with pedunculate naked umbels of rosy flowers.

2. COMMELŸNA.

Closely allied to the last genus, but of a more decided trailing habit, and with glabrous filaments. Named in honour of the Dutch botanists of this name.

1. *C. cœléstis*, syn. *C. tuberòsa*.—The prettiest of the hardy species. It is a dwarf much-branched plant with oblong-lanceolate leaves and clusters of blue or white flowers issuing from a spathe. It is a native of Mexico, and rather tender.

Order XVI.—JUNCÀCEÆ.

If we except *Narthècium ossífragum*, sometimes referred here, and mentioned by us under the *Liliàceæ*, there are no hardy ornamental species belonging to this order. And we merely mention it to point out the difference between these and the essentially glumiferous plants. We have here a regular 6-partite perianth in two series, but the segments are either green or brown and inconspicuous. The fruit too in the indigenous genera *Lùzula* and *Júncus* is capsular, either 1-celled and 3-seeded, or 3-celled and many-seeded, and the leaves flat or fistular.

Division II.—*GLUMÍFERÆ*.

Perianth none or reduced to minute scales. Flowers enveloped in imbricated membranous or coriaceous bracts called glumes. Fruit (in the orders referred to in this work) 1-celled, 1-seeded, perianth-scales usually adhering to the seed.

Order XVII.—CYPERÀCEÆ.

The Sedges are distinguished from the true Grasses by their usually angular solid not conspicuously jointed stems, and the sheath of the leaves when present is not split on one side. Leaves commonly very sharp at the edges. Anthers continuous with the filaments. Inflorescence paniculate, irregularly clustered, spicate or racemose. The greater number of the plants

of this order inhabit marshy places, and their herbage being coarse and rough is little sought after by cattle. There are upwards of 100 genera, including about 2,000 species, occurring in all parts of the world. Ten genera are represented in Britain by about 100 species. Some of the larger-growing species are stately or elegant, and may be introduced with effect in marshy spots of the wilderness or on the margins of streams and lakes. The genus *Càrex*, distinguished by its utriculate fruit, includes about one half of the species, some of which are amongst the most conspicuous and graceful of the hardy members of this order. They have commonly dense cylindrical eventually drooping spikes of flowers on slender stalks. *C. paludòsa*, *C. pseudo-Cypèrus*, and *C. ripària* are river-side species frequent in South Britain, the latter growing to a height of 5 or 6 feet in some localities. *C. péndula* is a common woodland species growing in dense tufts with large broad foliage and flowering stems, 5 to 7 feet, readily distinguished from all other native species by the very long (often 6 inches) and slender pendulous spikelets on long slender peduncles. *C. sylvática* is very abundant in woods and copses, and remarkable for its slender habit and pale yellowish-green herbage. A variegated variety of *C. Japónica* is cultivated.

The genus *Scírpus* has a cymose or fascicled inflorescence. *S. lacústris*, the Bulrush, is a conspicuous semi-aquatic species with terete spongy nearly leafless stems 8 to 10 feet high, in rich swamps. *S. sylváticus* is frequently met with in damp shady situations, and is remarkable for its leafy stems and very large bracteate cymes. *Erióphorum*, Cotton-grass, is readily known by the oval or oblong spikes, in which the bristles are exceedingly slender and silvery. *Clàdium Maríscus* and *Cypèrus lóngus* are tall-growing rather rare indigenous plants of this order.

Order XVIII.—GRÁMINEÆ.

Usually tufted herbs with slender terete or compressed jointed stems, hollow between the joints. Leaves linear, sheathing at the base; sheath split, and generally furnished with a small scarious scale (ligule) or tuft of hairs at its junction with the blade. Inflorescence spicate, racemose or paniculate. Anthers versatile. This is one of the most important assemblages of plants in the Vegetable Kingdom,

comprising Wheat, Oats, Barley, Rye, Maize, Rice, Millet, and many other kinds of grain, as well as the Sugar-cane. The genera are variously estimated from 250 to 300, and the species at about 4,500. There are many highly ornamental species, some of large stature and imposing aspect, and some of diminutive size and very graceful habit.

1. GYNÈRIUM.

This beautiful genus of Grasses needs little description, being well known throughout the country for its highly ornamental

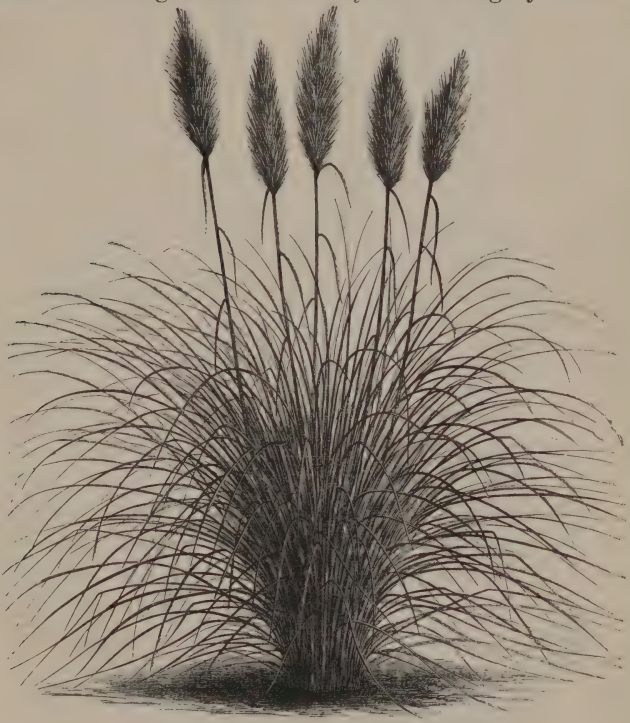


Fig. 260. Gynerium argenteum. (8 to 12 feet high.)

appearance. It belongs to the Reed tribe, having 2-flowered spikelets and unisexual flowers, the male and female borne on different plants. The etymology of the name is from *γυνή*, a female, and *ἔριον*, wool, in reference to the woolly stigmas. There are several species of this genus, but only one has been introduced.

1. *G. argénteum* (fig. 260). Pampas Grass.—One of the

most striking objects of the landscape garden, growing in dense tufts with narrow coriaceous gracefully recurved leaves 5 to 7 feet long, and flower-shaft 10 to 12 feet high bearing a dense terminal silvery panicle. The female plant is most sought after on account of its larger and more beautiful flower-spikes, due to the feathery stigmas. Other varieties have been raised with purplish or yellow panicles, and also one or two of a dwarfer habit. South America.

2. BAMBŪSA.

The Bamboo-Canes are readily distinguished by their jointed leafy flexuose branching stems, but those species which will endure the rigours of our winters are mere miniatures of the tropical species, some of which rise to a height of 60 or 70 feet. Although they possess branched stems, they, like all other Grasses, only flower once from the same culm; thus the appearance of the flower announces the death of the flowering stem. The flowers of most Bamboos are hexandrous. The stems are usually hollow and jointed, and when mature of a hard woody nature, and the leaves relatively shorter, lanceolate, and narrowed at the base. The hardy species or varieties are from Japan and China, and seldom attain a height of more than 10 or 12 feet in the most sheltered situations, and they are only suitable for planting in the South and West.

1. *B. Metàke*, syn. *B. Japónica.*—A dwarf much-branched species from 4 to 6 feet high. Leaves dark green, lanceolate, very acute, shortly petiolate; blade about a foot long, sheath ample. This species flowers freely in this country.

2. *B. falcàta*, syn. *Arundinària falcàta.*—A taller-growing hardy species from 10 to 15 feet, or in favourable situations occasionally as much as 20 feet high. Leaves bright pale green, distichous, linear-acute, about 4 or 5 inches long.

3. *B. viridi-glaucéscens.*—This is said to be one of the hardiest of the taller-growing kind, attaining a height of 9 to 12 feet. A very beautiful species with yellowish-green glaucous foliage.

4. *B. nìgra.*—A dwarf bushy species distinguished by its purplish ultimately glossy black stems.

5. *B. Fortùnei.*—A dwarf tufted plant from 1 to 2 feet high with very slender stems and long linear leaves. There are only variegated varieties of this in cultivation, under the names *variegàta* and *argenteo-vittàta.*

There are several other varieties or species in cultivation, as *B. aùrea*, *violàcea*, *pubéscens*, *verticillàta*, *Limònii*, etc.

Amongst our indigenous ornamental Grasses we may direct attention to *Arúndo Phragmìtis*, syn. *Phragmìtis commùnis*, Marsh Reed, the tallest and showiest of native Grasses, rising to a height of 6 to 10 feet, with dense silvery terminal panicles of flowers. *Phálaris arundinàcea variegàta*, the well-known Ribbon-Grass or Lady's Garters; *Brìza mèdia*, common Quaking-Grass; *Aìra flexuòsa* and *Agróstis Spica-vénti*—the two latter very graceful species.

The hardy exotic species we may divide into two groups, annual and perennial. To the former group belong *Lagùrus ovàtus*, Hare's-foot Grass; *Lamárckia aùrea*; *Polypògon Monspeliénsis*, Beard Grass (a very scarce British Grass), with dense spike-like inflorescence; *Agróstis nebulòsa*, *A. plumòsa*, *Brìza gràcilis*, *Eragróstis élegans*, *Piptátherum multiflòrum*, with graceful much-branched panicled inflorescence; *Chlòris barbàta*, *C. élegans*, *C. radiàta*, *Dactyloctènium Ægyptìacum*, *Eleusìne Barcelonénsis*, with fascicled spicate inflorescence; *Leptochlòa grácilis*, with the spikes arranged in a raceme; and *Pennisètum longistỳlon* and *Tricholàenaròsea*, with narrow panicles. All of the foregoing species are very beautiful, but for elegance, lightness and grace, those described as having a much-branched panicled inflorescence are the most desirable. *Zèa Mays*, Maize or Indian Corn, is a half-hardy annual of which there are many handsome variegated and other varieties in cultivation. Amongst perennial hardy exotic grasses the best are *Agróstis Stevèni*, *Eriánthus Ravénnæ*, *Mélica altíssima*, *Hórdeum jubàtum*, Squirrel-tail Grass; *Stìpa pennàta*, and other species, Feather Grass; *Andropògon argénteus*, *A. stríctus*, etc., ranging from 1 to 3 feet high. *Gymnothrix latifòlia* is a very beautiful large-growing grass in the way of *Gynèrium*, and *Sáccharum Maddèni* has fine ornamental foliage.

There are handsome variegated varieties of *Póa praténsis*, *Festùca ovìna*, *Dáctylis glomeràta*, *Arúndo Dònax*, etc., very effective for edging.

CRYPTOGAMOUS OR FLOWERLESS PLANTS.

Vegetables devoid of manifest staminate and pistillate flowers, and reproduced from spores which contain no distinct embryo.

DIVISION I.—*VASCULARES* OR *ACROGENS.*

Stem when present filled with vascular tissue. Plants reproduced from minute spores, which in germination form a membranous bulbiform or filamentous body termed the prothallus, upon which the reproductive organs are developed, giving rise to new individuals.

ORDER I.—**FÍLICES.**

Herbaceous or shrubby plants, sometimes attaining the dimensions of trees in the tropics and the temperate regions of the southern hemisphere. Stem when erect simple, but as a creeping rhizome often branched. Leaves (here termed *fronds*) tufted or alternate, simple or more or less divided; vernation circinate, or rarely straight as in the *Ophioglósseæ*. Petiole or stipes continuous or jointed, rachis or midrib often grooved above. Fructification consisting of minute capsules of spores borne in clusters (*sori*) on the under side or edge of the fronds, or sometimes on separate fronds. Sori naked, or covered with an orbicular peltate reniform linear bivalved or urceolate involucre or indusium. Capsules or spore-cases sessile or stipitate, frequently intermixed with bristles, or imperfect spore-cases. Ferns inhabit nearly all climes, but they are rare in very cold and arid regions, and attain their greatest development in tropical and temperate countries possessing a humid atmosphere. There is a wide divergence of opinion amongst pteridologists as to the number of genera and

species. Sir W. J. Hooker, in his 'Synopsis of all Known Ferns, reduces the number of genera to 75, containing about 2,500 species; but other authors, who are content to establish genera upon much more slender characters, raise the number to above 200, with a corresponding increase in the number of species. It is a fact beyond controversy that Ferns are equally as variable as any other class of plants, and this tendency to varia-



Fig. 261. Tree Fern.

tion is well exemplified in our native species, without including the numerous pretty though abnormal forms which have increased so vastly in cultivation during the last twenty years. With the exception of a few species from Northern Asia and North America, and perhaps a few from the southern hemisphere, we are limited to our native species for hardy subjects in this beautiful group of plants. In sheltered and partially shaded situations, many of the Tree Ferns (fig. 261) may be

effectively employed for Summer decoration. Indeed it is probable that in the warm sheltered humid valleys of South-western England, Wales, and Ireland, a few of the species from the extreme South of New Zealand and America would flourish with slight protection in very severe weather. The hardiest known are *Dicksònia squarròsa*, *D. antárctica*, *Alsóphila Colensòi*, *Cyathèa dealbàta* and *C. medullàris* from New Zealand, and *Alsóphila pruinàta* from Chili. We append an abbreviated synopsis of the British species, including a few other known hardy species, for which we have adopted what may be termed the Hookerian nomenclature. We have included a few of the more important synonyms, and also the names of the sub-species or varieties commonly seen. But further than this the limits of our work will not permit us to go. The named varieties of British species, distinct or otherwise, offered by Fern-growers, are now numbered by the hundred. Many of them are extremely beautiful, and worthy of cultivation. The species most prolific in varieties are *Lomària Spìcant*, *Asplènium* (*Athýrium*) *Filix-fœmina*, *Scolopéndrium vulgàre*, *Polypòdium vulgàre*, and *Aspídium* (*Polýstichum*) *aculeàtum*.

Sub-Order I.—Polypodiàceæ.

Fronds simple or compound, circinate in vernation. Indusium marginal, or dorsal, or absent. Spore-cases small, usually stalked, not on an elevated receptacle, partially or wholly surrounded with a vertical elastic ring bursting transversely.

1. ADIÁNTUM.

Rhizome creeping. Fronds 2- to 4-pinnate, pinnules usually cuneate or unequal-sided; stipes and petioles usually slender; veins forked. Sori marginal, interrupted or continuous. Indusium formed of the reflexed margin of the frond. There are upwards of 60 species, found in the temperate and tropical regions. Ἀδίαντον is the Greek name for the common species.

1. *A. Capíllus-Véneris*. Maiden-hair Fern.—Frond 6 to 12 inches high, irregularly 3- or 4-pinnate; pinnules alternate, wedge-shaped, crenate, thin. Sori oblong. Stipes and rachis slender, nearly black, shining and brittle. Rare on damp rocks near the sea in South-western England and Western Ireland, and extending to temperate and tropical Asia, Africa and America.

A. pedàtum, a species occurring both in North America and Asia, is nearly or quite hardy in suitable situations. It has dichotomous fronds, the main divisions of which are flabellately branched, and small dimidiate pinnules broadest on the side nearest the stem.

2. PTÈRIS.

Rhizome creeping. Frond coriaceous, 3- or 4-pinnate ; veins free. Sori marginal, continuous. Indusium membranous, confluent with the recurved margin. A large genus containing about eighty species, found in all parts of the world except the very coldest. The name is from πτερόν, a wing, in allusion to the form of the fronds.

1. *P. aquilìna.* Brake or Bracken.—It is unnecessary to describe this the commonest of all native Ferns in detail. In different situations its fronds vary from 1 to 8 feet or more high, with a tall stout stipes. This Fern is found in nearly all parts of the world.

3. CRYPTOGRÁMME.

Rhizome tufted. Fronds 2- to 4-pinnatifid, outer sterile, inner fertile ; veins forked, free. Sori terminal, nearly circular, at length continuous. Indusium continuous with the reflexed margin of the pinnules. This genus is limited to the following species, which is widely dispersed throughout the north temperate and arctic regions. The name is compounded of κρυπτός, hidden, and γραμμή, writing, in allusion to the concealed sori.

1. *C. crìspa*, syn. *Allosòrus crìspus.* Parsley Fern, Rock Brake.—A dwarf tufted Fern with Parsley-like barren fronds, about 8 inches high, tripinnate ; pinnules bi-tri-pinnatifid ; stipes short. This plant is found in mountainous districts in Britain, and extends to Asia and North America.

4. LOMÀRIA.

Rhizome tufted or creeping. Fronds once pinnate or pinnatifid ; outer spreading, barren ; inner erect, slender, and fertile. Sori linear, covering the under side of the pinnules. Indusium scarious. There are forty species referred to the genus. The name is from λώμα, a border, or fringe, the marginal sori.

1. *L. Spìcant*, syn. *Blèchnum boreàle.* Hard Fern.—Fronds tufted, 12 to 18 inches high ; barren ones lanceolate in outline, pinnate below, pinnatifid upwards ; pinnules oblong. There are

many beautiful crested, fringed and variously lobed varieties. Common in Britain and the temperate and arctic regions of the north.

Woodwárdia orientàlis is a handsome Japanese Fern of large size with pinnate fronds and pinnatifid pinnæ, and the sunken sori in single rows parallel with the midrib.

5. SCOLOPÉNDRIUM.

Rhizome thick, tufted. Fronds tufted, simple, coriaceous. Sori on the veins, in opposite transverse lines at right angles to the midrib. Indusium linear, double. There are nine species, found in temperate and tropical regions. The old Greek name.

1. *S. vulgàre.* Hart's-tongue Fern.—A common species in hedgerows and shady places, where the ligulate fronds vary from 6 inches to 2 feet or more in length. The varieties are very numerous, and many of them highly curious. This also has a very wide range of distribution.

6. ASPLÈNIUM.

(Including *Céterach* and *Athýrium.*)

Rhizome tufted, or slightly elongated. Fronds simple or compound. Sori on the veins, linear or oblong. Indusium linear, membranous, attached to the vein and opening inwards. A very large genus, including nearly 300 species, and represented in all except the very coldest countries. The name is from *ἀ*, privative, and *σπλήν*, spleen, in allusion to the reputed medicinal properties of some species.

§ 1. Euasplènium.—*Indusium straight, narrow; margin entire or erose. Frond not scaly beneath; veins free.*

1. *A. Rùta-murària.* Wall Rue.—This is the little tufted Fern so common on walls and rocks, with irregularly bipinnate fronds and cuneate pinnules.

A. Germánicum, syn. *A. alternifòlium*, and *A. septentrionàle*, are allied species of more erect growth, and fronds with narrow, linear segments. They are both rare in Britain.

2. *A. Trichómanes.*—A dwarf tufted Fern with linear pinnate fronds 4 to 8 inches long, and numerous oblong dark green pinnules. Stipes dark brown, shining. Sori oblique. Frequent in Britain on walls, banks, &c., and one of the most attractive of small hardy species. Distribution general in the north temperate zone.

A. víride differs in its smaller size and green rachis. It is found in the mountains of Wales and Scotland.

3. *A. marìnum.*—This is a stout tufted species from 6 inches to a foot high, with pinnate coriaceous oblong-lanceolate fronds, and oblong crenate pinnules. It grows on rocks in the vicinity of the sea, chiefly in the south-west. It occurs in South-western Europe, North Africa, and North America.

4. *A. Adiántum-nìgrum.*—This is perhaps the commonest of the native species of this section. It has bi- or tripinnate triangular coriaceous fronds 6 to 12 inches long, with narrow pinnatifid and toothed pinnules. Stipes slender, naked. It is found throughout Europe, North Africa, and Western Asia, growing on dry banks and rocks.

A. lanceolàtum is very near the last, but the fronds are membranous, and the pinnules narrower and more acute. It is rare in Britain, and only found in Wales and Western England.

§ 2. Céterach.—*Frond covered with chaffy scales beneath; veins anastomosing.*

5. *A. Céterach*, syn. *Céterach officinàrum.*—Fronds about 6 inches long, pinnatifid; pinnules alternate, rounded. This Fern is readily known from all other indigenous species by its linear-lanceolate coriaceous fronds, which are densely clothed beneath with rusty chaffy scales, effectually concealing the fructification. It is usually found on walls and dry banks. It is a native of Europe, Western Asia, and North Africa.

§ 3. Athýrium.—*Indusium oblong or reniform, fringed at the margin. Veins free.*

6. *A. Fìlix-fœmina.* Lady Fern.—A very beautiful species with delicate bright green bi- or tripinnate fronds from 1 to 4 feet high; pinnules small, crowded, sessile, acuminate. Stipes stout, densely dotted with chaffy scales at the base. The numerous varieties in cultivation differ in size, aspect, and in the cutting and lobing of the fronds to a degree almost incredible, and include some of the most elegant and graceful of hardy Ferns. *A. Rhàticum* with bipinnate narrow fronds, and *A. incìsum* with very large tripinnate fronds, are two of the commonest wild forms. Widely distributed in the northern hemisphere.

7. CYSTÓPTERIS.

Rhizome tufted or creeping. Fronds tufted or scattered, 1- to 4-pinnate, delicate in texture; veins pinnate or forked, ultimate venules free. Sori dorsal, globose on the free venules. Indusium membranous, convex, attached to the venule below the sorus. There are five species from temperate regions. The name is from κύστις, a bladder, and πτερίς, a fern, referring to the form of the indusium or involucre.

1. *C. frágilis.* Common Bladder Fern.—A handsome tufted Fern from 6 to 12 inches high, with bright green pinnate or bipinnate fronds on short brittle stipes. Pinnules triangular or ovate; rachis slightly winged. Sori few or many on each pinnule. Throughout Britain, though rare in the south, and widely spread in both the north and south temperate regions. *C. dentàta* and *C. Dickieàna* are varieties of this species.

C. montàna is a delicate mountain species with 3- or 4-pinnate fronds, found at a great elevation in Scotland.

Onóclea sensíbilis is a hardy North American Fern with separate barren and fertile fronds. The former are about 18 inches high, simply pinnate, with long lanceolate toothed pinnæ, and the shorter fertile ones are bipinnate. Indusium inferior, bursting irregularly.

Struthiópteris Germánica is an allied Fern having the fronds disposed in a tufted rosette. The barren fronds are from 2 to 3 feet high, lanceolate, bipinnate with narrow pinnules. The fertile fronds are pinnate, and appear within the barren ones, and are much shorter. A widely diffused plant. Both this and the last are very handsome and desirable for planting in damp places, on the margins of pools, or partially in water.

8. WÓODSIA.

Tufted dwarf Ferns with pinnate fronds, of which the stipes are usually jointed above the base. Sori globose; indusium attached under the sorus, at first cup-shaped and entire, ultimately breaking up into filiform segments. There are 14 species described, from arctic and alpine regions. This genus is dedicated to Joseph Woods, an English botanist, author of the 'Tourist's Flora,' &c.

W. hyperbòrea and *W. ilvénsis* are found in Britain at considerable elevations in Wales, North England and Scotland. In the first the ultimate lobes of the linear-lanceolate fronds are entire, and in the second they are crenate, and the frond is broadly lanceolate in outline.

9. ASPÍDIUM (*Polýstichum*).

Tufted evergreen Ferns with pinnate fronds, globose sori, and a peltate orbicular indusium. Upwards of fifty species are described, dispersed nearly all over the world. The name is derived from *ἀσπίς*, a shield, the form of the indusium.

1. *A. aculeàtum*, syn. *Polýstichum aculeàtum*.—This is one of our commonest hedgerow Ferns, and one of the best for general planting. It has large lanceolate bi- or tri-pinnate fronds, of which the stipes and rachis are more or less clothed with ferruginous scales. The pinnules are obliquely rhomboid, auricled and mucronate or awned, and the sori are arranged in a single row on each side of the midrib. There are three tolerably distinct forms:—*A. lobàtum*, with bipinnate fronds and rigid sessile decurrent pinnules, confluent below; the variety *lonchitidoìdes* is still narrower, approaching *Lonchìtis*; *A. aculeàtum* proper has larger looser fronds with free sessile pinnules furnished with spinulose teeth; and *A. angulàre* is somewhat membranous with small stalked loose pinnules having bristly teeth. This species is found in Europe, Western Asia, North America, and the south temperate regions.

2. *A. Lonchìtis*.—The fronds of this species are linear-oblong and simply pinnate, with obliquely falcate spinulose pinnules; and the sori are arranged in two or three rows on each side of the midrib.

Aspídium falcàtum, syn. *Cyrtòmium falcàtum*, is a very distinct hardy Fern, from China, Japan, etc., with simply pinnate rigid coriaceous shining fronds and large obliquely ovate-acuminate pinnules and numerous scattered sori. *A. caryotidèum* is a variety with larger pinnules, opaque above. *A. Fortùnei*, syn. *A. anomophýllum*, has narrower, more numerous opaque pinnules and shorter stipes.

10. NEPHRÒDIUM (*Lástrea*).

This genus differs from the last in its reniform indusium, which is attached by the sinus. The sori are either dorsal or terminal on the free venules in the British species. As defined by Hooker and Baker, this genus comprises upwards of 200 species. The name is from *νεφρός*, a kidney, the shape of the indusium.

1. *N. Fìlix-mas*, syn. *Lástrea Fìlix-mas*. Male Fern.—A very common British Fern with bipinnate tufted fronds from 1 to 3 feet long, springing from a short thick rootstock, sometimes

forming a short stem above ground. Stipes short. Pinnules oblong, more or less toothed. Sori large, in one row on each side of the costa. There are several varieties, differing in the size and division of the frond and the quantity of chaffy scales on the stipes and rachis. *N. Bórreri*, *N. abbreviàtum*, *N. áffine*, and *N. cristàtum*, of Swartz, not of Richard, are forms of this species, in addition to which there are several crested and proliferous varieties in cultivation. A widely-dispersed species.

N. cristàtum differs from the foregoing in its flat, not convex indusium, and in the broad base of the pinnules; and *N. rígidum* in its mucronate rigid pinnules. Both are comparatively rare in Britain.

2. *N. spinulòsum*, including *N. dilatàtum*, etc.—This is another common species, usually affecting moist shady situations. It is a very variable plant in its extreme forms. The fronds are rather flaccid, dark green, bi- or tri-pinnate, on long slender stipes, and usually somewhat deltoid in outline. Pinnules lobed to the rachis, furnished with awned teeth. A native of Europe, Asia, North America, and North and South Africa.

N. æmulum has a more triangular and divided concave frond, smelling strongly of hay.

3. *N. Thelýpteris.* Marsh Fern.—This is a delicate species with creeping rootstocks, lanceolate pinnate fronds about a foot or 18 inches, or even more high; pinnæ deeply pinnatifid; pinnules entire. Stipes equalling or exceeding the leafy part of the frond, very slender and nearly or quite naked. It grows in marshy and boggy places, and the fronds are only of short duration. Widely distributed.

4. *N. Oreópteris*, syn. *N. montànum.* Sweet Mountain Fern.—A handsome mountain species with tufted lanceolate pinnate fronds, pinnæ pinnatifid, glandular beneath, the lower more distant and gradually smaller; pinnules entire. Stipes short, scaly. A native of Europe and Western Asia.

There are several handsome Japanese species of this genus belonging to the section *Lastrèa*, as *N. atràtum*, *N. opàcum*, and *N. erythrosòrum.*

11. POLYPÒDIUM.

This genus is distinguished amongst hardy Ferns by its globose sori, destitute of an indusium or involucre. Rhizome creeping or tufted; fronds simple, pinnatifid, or pinnate. Nearly 400 species of widely different habit are collected under this name,

which is derived from πολύς, many, and πούς, a foot, probably in allusion to the numerous creeping rhizomes of *P. vulgàre.*

1. *P. vulgàre.*—This Fern is readily distinguished from all other native species by its creeping densely scaly aboveground rhizomes and alternate pinnatifid glabrous stipitate fronds with oblong obtuse pinnules and conspicuous yellow eventually reddish-brown naked sori. It flourishes best on stumps of trees, etc., by the side of brooks or moist places, but it may frequently be seen on old walls, etc. The variety *Cámbricum* has the pinnules finely divided.

2. *P. Dryópteris.* Oak Fern.—An elegant species with slender creeping rootstocks and alternate bipinnate deltoid membranous fronds of a pale green colour, rarely more than 6 to 9 inches high. Stipes slender, scaly at the base. Frond divided into three nearly equal branches, forming a triangle; pinnules obtuse, obscurely toothed. This is found in shady mountainous districts in Britain, and is widely distributed in the northern hemisphere.

P. Robertiànum, syn. *P. calcàreum*, is very near the last, and perhaps only a variety of it. The fronds are more coriaceous and glandular, and the lateral branches of the frond are smaller than the central one. It is a rare Fern in Britain, growing on limestone rocks.

3. *P. Phegópteris.* Beech Fern.—A delicate small-growing species with pale-green pinnate triangular fronds from 6 inches to a foot high. Pinnæ pinnatifid, the lower pair much smaller than the others and deflexed. Pinnules obtuse, ciliate; stipes very slender and brittle, exceeding the leafy portion of the frond, slightly scaly at the base. Moist shady woods and rocks throughout Britain. Distribution general in the north temperate zone.

4. *P. alpéstre*, syn. *Pseudathýrium alpéstre.* — This is strictly an alpine species, resembling the Lady Fern in general appearance. It has a stout rhizome and lanceolate bipinnate fronds varying from 6 inches to 2 or even 3 feet in height. Pinnæ pinnatifid; pinnules toothed. Stipes 4 to 6 inches high, scaly at the base. Sori arranged in a single row on each side of the midrib. In Britain only on the lofty mountains of Scotland, and in arctic and alpine Europe, North America, and Western Asia.

P. flexile or *hùmile* is a variety with looser narrower fronds, and more distant deflexed pinnæ.

Polypòdium or *Niphóbolus Lingua* has coriaceous entire strap-shaped fronds, rusty tomentose beneath. It is a native of Japan and other Eastern countries.

12. GYMNOGRÁMME.

This is a very large genus containing nearly one hundred species, chiefly from tropical climates. Like the last, it has naked sori, but here they are linear. The name is from *γυμνός*, naked, and *γραμμή*, writing, in reference to the naked sori.

1. *G. leptophýlla.*—This is a dwarf fragile annual species with bi- or tri-pinnate tufted fronds and narrow linear pinnules. The inner fronds are on longer stipes, and more fruitful than the outer. It is a very widely distributed plant, and may be raised from spores with very little trouble.

Sub-Order II.—Hymenophýlleæ.

Rootstock creeping. Fronds circinnate in vernation, very delicate and almost transparent, with reticulate veins. Involucre bivalved or bilabiate. Spore-cases sessile, on a clavate or filiform receptacle surrounded with a complete oblique or transverse ring.

13. HYMENOPHÝLLUM.

Fronds small, twice to four times pinnatifid or pinnate; pinnules with a midrib and no lateral veins. Sori marginal, axillary or terminal. Involucre bivalved, of the same texture as and sunk in the frond, or free. Spore-cases sessile, on a columnar receptacle within the involucre; ring oblique. There are seventy species known, chiefly from tropical and south temperate regions. The name is from *ὑμήν*, a membrane, and *φύλλον*, a leaf, from the texture of the fronds.

1. *H. Tunbridgénse.*—Fronds 1 to 4 inches high, ovate, pinnate at the base, pinnatifid upwards; pinnules linear, undivided or bifid, bristly toothed. Involucre toothed. This elegant little plant grows in dense matted patches, and in habit resembles more some of the *Hepáticæ* than the true Ferns. It is found in moist, shady situations in many parts of Britain, and throughout Europe from Belgium southwards, and also in the south temperate regions.

2. *H. unilaterále*, syn. *H. Wilsòni.*—This is very near the last, but it has recurved darker green more rigid pinnæ, and entire lips to the involucres. It has about the same range as No. 1.

14. TRICHÓMANES.

This genus differs from the last in its cup-shaped involucre, and its long filiform receptacle. About eighty species are found in temperate and tropical countries. The derivation of the name is variously explained, but all of the explanations are open to doubt.

1. *T. radìcans.* Fronds 6 to 12 inches high, pellucid, bi- or tri-pinnatifid, rachis winged. Stipes 2 to 6 inches, stout and wiry. This is very rare, and the only native species. It is found in Wales, and in a few localities in Ireland, in the vicinity of streams or waterfalls.

The members of this and the foregoing genus are not suitable for open-air culture except under quite peculiar conditions.

Sub-Order III.—Osmúndeæ.

Fronds coriaceous or membranous, circinnate in vernation. Spore-cases clustered in a branched panicle terminating the frond, 2-valved, opening across the apex, and furnished with a short horizontal ring.

15. OSMÚNDA.

Rhizomes tuberous, densely branched, clothed with fibres. Fronds coriaceous, tufted, once or twice pinnate. There are six species from various temperate and tropical regions. Named after a Celtic deity.

1. *O. regàlis.* Fern-Royal.—This is the noblest of our native Ferns, sometimes attaining a height of 10 feet. The fronds are bipinnate, branched, and fertile at the top. It is found in damp, boggy woods in this country, and is widely diffused in the north temperate zone.

O. Claytoniàna, syn. *O. interrúpta*, is a dwarf species about 18 inches or 2 feet high, clothed with a ferruginous tomentum when young, with the barren and fertile pinnæ intermixed; and *O. cinnamòmea* has distinct fertile and sterile fronds, the former much the smaller. Both are hardy, and natives of North America, &c.

Sub-Order IV.—Ophioglósseæ.

Fronds straight in vernation. Spore-cases large, 2-valved, destitute of a ring, arranged in spikes or panicles.

16. OPHIOGLÓSSUM.

Rootstock with fleshy fibrous roots. Frond oblong-lanceolate, with a simple fertile spike attached to it, much in the way of the spathe and spadix of the *Aroidèæ*. Spore-cases confluent, globose, arranged in a distichous spike. There are about four widely-distributed species. Name from *ὄφις*, a snake, and *γλῶσσα*, a tongue, in allusion to the fertile spike.

1. *O. vulgàtum.* Adder's Tongue.—This curious little plant is very distinct from all other Ferns. The single frond is from 3 to 9 inches high, with a blade from 2 to 4 inches long, and varying from ovate-oblong to lanceolate. There are two forms—*vulgàtum* proper, with ovate fronds and long fertile spikes; and *Lusitánicum*, with narrow lanceolate fronds and spikes less than an inch long. The former is not uncommon in pastures and woods, and it is also common in the temperate regions of the north and south.

17. BOTRÝCHIUM.

This genus differs from the last in its pinnate or bipinnate fronds and compound panicle of clustered spore-cases. There are six species, from temperate and tropical regions. The name is derived from *βότρυς*, a cluster, the form of the inflorescence.

1. *B. Lunària.* Moonwort.—Frond fleshy, about 4 or 6 inches high, pinnate, with lunate, crenate, or pinnatifid pinnæ. A widely distributed plant, but not so frequent in Britain as its ally the Adder's Tongue.

The remaining orders of this division are scantily, if at all, represented in gardens, except under glass. We have several native species of the *Lycopodiàceæ*, five belonging to the genus *Lycopòdium*, and one to *Selaginélla*. There is also one hardy, or nearly hardy, Japanese species belonging to the latter genus, *S. involvens*. It belongs to the section with dwarf rosulate flat fan-like branches. Of the *Equisetàceæ*, the very large Horsetail, *Equisètum máximum*, syn. *E. Telmateía*, deserves mention, as it is a grand plant for introducing in damp rich soil, where it is not fully exposed to the sun. In favourable situations its barren stems rise to a height of 6 or 8 feet. The distinct manner of growth peculiar to this genus, in which the lateral branches are arranged in whorls one above the other from a sheathed jointed stem, is sufficient to entitle it to a place in the gardens of the curious.

PART II.

PRACTICAL GARDENING.

CHAPTER I.

THE CULTIVATION OF PLANTS.

The successful cultivation of plants depends upon a great variety of conditions essential to their perfect development, such as climate, soil, and general treatment. We devote a few pages to the consideration of each of these conditions in their relation to plant life. These paragraphs are necessarily brief, but we have endeavoured to condense as much information in them as the space at our disposal will admit of; and we have confined ourselves to simple explanations or directions, as the case may be, for the use of those possessing little practical knowledge.

§ 1. Vegetable Physiology and Economy considered in their relations to Horticulture.

A few words on the composition of the permanent fabric of plants and the principal phenomena of plant-life may serve to show the importance of exercising the utmost care and forethought in all cultural operations.

Vegetable organisms consist of every intermediate gradation between a single cell without any visible reproductive organs, up to very complex combinations and modifications of tissue and elaborate organs of reproduction in the higher stages of development. We purpose limiting our remarks to the growth, composition, and functions of the nutritive organs, or root, stem, and leaves. All plants coming within our province are built up of an infinity of cells, forming two principal kinds of tissue, namely, vascular or woody tissue, and cellular or her-

baceous tissue. The cells themselves are composed of carbon, oxygen, and hydrogen, and their contents of the same elements, with the addition of nitrogen. With these essential elements several others are associated in different plants. The commoner ones are phosphorus, sulphur, silex, potash, soda, and lime. The chemical compounds of organic origin are ternary, quaternary, or even more complicated ; whereas inorganic compounds generally are binary. Sugar and starch may be mentioned as the most familiar vegetable compounds. Amongst vegetable acids, citric, malic, and oxalic are the commonest. Quinine, cinchonine, and morphine are valuable alkaloid drugs.

The principal phenomena of plant-life coming under our consideration are : *germination*, *absorption*, and *respiration*.

1. *Germination.*—This is the first phase in the development of independent life in a plant from a seed. In order to accomplish this stage certain conditions are indispensable. These essential conditions are : warmth, moisture, and air. The temperature at which seeds will germinate varies considerably in different species, ranging mainly from 40° to 75° Fahrenheit. But the seeds of some hardy plants will vegetate at a lower temperature, whilst a few tropical things require a still higher degree of warmth to start them into life. There must be sufficient moisture within reach of the seed to enable it to burst its coat by absorption and feed the young embryo. And the access of air is indispensable to effect the chemical changes to which the contents of the seed are subject in germination for the use of the young plant. Unless these three conditions are united in their proper degrees, the seeds will soon perish, especially if there be an excess of humidity. In the absence of moisture, and when not exposed to deleterious atmospheric or other influences, some seeds will retain their germinating powers for many years, whilst others will not grow after the first season. Most seeds contain the nourishment required for the support of the young plant in its earliest stage. This is stored up either in the embryo itself, and chiefly in the cotyledons, or it is present in the form of starch and other ingredients, in the albumen, surrounding the embryo, and constituting in many cases the bulk of the seed. When a seed is committed to the soil, it more or less rapidly absorbs sufficient water to soften its coats and distend the tissue of the embryo, causing it to push forth its radicle or rootlet, which invariably turns downwards, no matter what the position of the

seed may be. This is soon followed by the appearance of the plumule or growing point of the stem, emerging from between the cotyledons when there are two, or laterally when there is only one.[1] Immediately water is absorbed, and, other conditions being favourable, important chemical changes are started into operation. The most important is the transformation of the insoluble starch of the perisperm or cotyledons into soluble sugar, thereby rendering it available to circulate with the imbibed water in the growing tissue. This constitutes the first food of the young plant, just as milk is the first nourishment of the young of mammiferous animals, and the white of an egg the support of the young bird during the period of incubation. The solution of the starch is gradual in its action, and, when this provision is exhausted, if due care has been taken in the selection of soil and in the supply of moisture, the young plant will be in a state to draw and to assimilate the elements it requires from the earth. In by far the greater number of plants the cotyledons are borne above the soil, as in the Scarlet Runner Bean; but there are others, like the Pea, in which they remain buried in the ground. And, again, there are others in which the cotyledon or cotyledons never become free from the seed-shell, especially of those seeds of which the albumen is of a horny nature, and in which the process of conversion into sugar is slow; the cotyledons serving in this case as conductors of the sugary matter to the young plant, according as it is developed from the albumen. So long as the cotyledons remain buried beneath the soil, they retain the white hue they had in the seed; but as soon as they are brought under the influence of light, they secrete chlorophyll, and otherwise fulfil the functions of true leaves.

The time consumed by seeds in germination varies according as the conditions are more or less favourable for the same species; but there is a greater difference in the time required by the seeds of different species. Certain seeds, those of the common Mustard (Sinapis alba) amongst others, will germinate in forty-eight hours, or even in a shorter period; whilst the majority of seeds require a week, and from that to several weeks. And lastly, there are some seeds that exhibit no sign of life until they have been in the ground one or two years. These

[1] The germination of Ferns, as explained under that order, is a very different process; the act of impregnation not taking place till after the first stage of development of the spores.

are principally such as have hard woody or horny integuments, those of the Rose, for example. Experience has, moreover, taught that the older seeds are the longer they are in germinating. Some seeds must be sown almost immediately after they are harvested, as contact with the air causes them to decay and soon destroys their vitality; hence the difficulties encountered in introducing many desirable exotic plants. Others, again, will retain their germinating powers for a great number of years. And we may add that seeds buried too deep in the soil for atmospheric influences to reach them will preserve their vitality for a period to which we can assign no limits—perhaps thousands of years, as would appear from the plants that often spring up on newly moved soil and in fresh clearings, which are sometimes different from any previously seen in the surrounding country.

2. *Absorption.*—This term is employed to designate the act by which a plant draws the materials necessary for its growth and sustenance from the soil and air. All parts of a plant contribute to the fulfilment of this function, or at least so long as they are young and herbaceous. But the root is the principal channel for the conveyance of the various constituents which go to build up a plant. And the tender extremities (spongioles) of their fibrils or ramifications are the most active points. Leaves, too, are provided with numerous minute openings, termed stomates, which, according to the state of the weather and the amount of moisture contained in the plant, are either open or closed.

The elements taken up by plants through these two channels are either in the gaseous or liquid state, for not the minutest particles one could imagine to be held in suspension by water can enter. It may readily be conceived that very fine, almost impalpable grains of dust may mechanically penetrate the stomates, but it does not follow that they are absorbed. On the contrary, they obstruct and destroy these passages and prevent the leaves from exercising their physiological functions in a regular manner, and consequently the health of the plant becomes impaired. This effect is well-known to gardeners, especially on window and conservatory plants, and on those in the open air near public roads, which they obviate by frequently syringing, or otherwise the plants would inevitably be choked. In the natural order of things the rains are sufficient to accomplish this purpose. The action

of the roots is exercised especially on the water contained in the soil, principally in its ordinary liquid state. This water is never quite pure. By virtue of its dissolving qualities it is more or less charged with various foreign matters, the most important of which for vegetation are the salts of potash and soda, the phosphates and carbonates of lime, and ammoniacal and carbonic acid gases. Brought into contact with the constantly renewed cellules of the spongioles, they enter and are transmitted through all the ramifications of the plant. These spongioles act as perfect filters, permitting the passage of materials held in solution, but barring it effectually to the corpuscles that are merely held in suspension by the fluids. The circulation of these fluids from cell to cell through the plant is effected by a process termed endosmosis, and dependent upon a difference in the density or chemical composition of the contents of the neighbouring cells, which causes a current to set in through the permeable partitions of the cells, and continue so long as there is a disparity in their contents. The amount of evaporation from the leaves governs to a certain extent the flow of the sap. Neither the cells of the spongioles nor of any of the tissues which the absorbed water traverses are empty, for they already contain liquids charged with diverse substances, principally sugary matters. The water pumped up from the soil mixes with these liquids, and becomes thereby what is termed the crude or ascending sap, in contradistinction to the elaborated or descending sap. It receives the latter designation after it has been assimilated, or undergone important alterations by exposure to atmospheric influences in the leaves, and rendered fit for the alimentation of the plant. It is scarcely necessary to explain that the ascending course of the sap is not exactly the same in all vegetables, but varies according to the structure of the species. In Dicotyledons or Exogenous plants, and particularly in trees, where it has been more carefully studied, it rises through the young wood or alburnum; and the assimilated sap descends through the inner layers of the bark. Sap rises, everything else being equal, in proportion to the number and size of the conducting channels. This effect is more easily seen in plants with slender scandent stems, like the Vine and Ivy, which can climb to the summits of lofty trees or buildings. In the majority of these plants there is a great development of foliage, and consequently a large quantity of moisture is lost by

transpiration, especially when the atmosphere is very dry. To keep up a corresponding supply there must be free and rapid circulation, which is the case in the Vine, as everybody knows who has cut an active growing cane, and observed the copious discharge of sap. A transverse section of the Vine will show these vessels even without the aid of a lens.

The chief substance useful to man furnished by the sap of plants is sugar, which is produced by such diverse plants as the Sugar-cane, Beet, Sugar Maple, and many Palms, etc.

As we have previously observed, the leaves and other green parts of plants are also organs of absorption ; but their action is limited to the imbibition of aqueous vapour and the gases contained in the air, principally oxygen, carbonic acid, and ammoniacal gases.

3. *Respiration.*—The respiration of plants is a very complicated function, having its seat in all the green parts, but more especially in the leaves. It results in the elaboration or assimilation of the sap, which through this agency becomes available for building up and nourishing the vegetable fabric. Looked upon from this point of view, then, the leaves are analogous to the lungs of animals, as those organs form the principal laboratory for the production and purification of the blood. We shall see that light exercises considerable influence over this important function.

When the ascending sap reaches the leaves and fills their cells, it is rapidly concentrated by the evaporation or transpiration of its surplus water. This water, which is no longer separated from the outward air except by the thin cell-walls, penetrates them and is dispersed in the atmosphere in the form of invisible vapour, to which the stomates give issue. The drier the air, the greater the transpiration from the leaves, and the greater the consequent tax upon the roots to keep up an adequate supply by absorption. This is one of the most important points connected with economy of plant-life for the consideration of the practical gardener. The principal cause of loss by death of newly transplanted trees and shrubs, especially if removed, as in the case of evergreens, in full foliage, or shortly before deciduous species put forth their leaves, is due to the inability of the roots to maintain the necessary supply of water to compensate for that transpired, causing the tissues of the foliage to shrivel and ultimately become unable to perform the operation. This will frequently happen when

the greatest care has been exercised in the removal to secure all the roots without injury, and when abundance of water is within their reach. This may arise from a paucity of small roots; and when a tree has but a few large coarse roots, it is almost impossible to lift it with a ball of earth; and a very short exposure of the fibrils to a drying wind will destroy their delicate spongioles or absorbing parts. Some plants will readily replace their fibrils, whilst others, and especially those with coarse roots, do so with difficulty, or not at all, if the circumstances be unfavourable. In instances of this kind it is useless to confine one's attentions to the roots. The top must be cared for, and this is best done by covering it over with bast mats in very hot sunny or drying weather. From time to time the mats should be moistened to moderate the transpiration of the plant. The trouble involved in this operation would be amply repaid by the preservation of choice shrubs.

After a prolonged drought the leaves of many herbaceous plants, whose roots do not penetrate far into the soil, droop during the day when exposed to the fierce rays of the sun, because the evaporation is in excess of the absorption. But the dews of night are sufficient, as a rule, in our climate, to afford them moisture enough to rise again and recover their former firmness. In hotter, drier climates, however, as in some parts of tropical and sub-tropical Africa, a great number of plants succumb, that would otherwise have enjoyed a much longer existence. In dull, rainy weather the amount of evaporation is almost nil.

From the differences in their structure, plants possess greater or less power of resisting the effects of continued dry weather. These differences are in texture, number of stomates, thickness of epidermis, and also depth reached by the roots. Relatively, annual and perennial herbs suffer more from drought than woody and arborescent plants; and aquatic plants wither almost directly they are taken from the water. Trees with coriaceous leaves, like the common Box, with hard wood or deep roots, suffer little from long droughts; and the same may be said of most plants with succulent, fleshy leaves or stems, owing to their thick epidermis and few stomates. The plants belonging to the latter category abound in hot, dry countries.

The condensation of the sap in the tissues of the leaves is insufficient of itself to give it the necessary nutritive pro-

perties which should distinguish it. It has yet to undergo important modifications in its chemical composition. A certain temperature is indispensable to accomplish this change; but it is sunlight that plays the principal rôle.

Delicate and complicated experiments have demonstrated the fact, that (in many instances, at least) during the day, and especially when exposed to the direct rays of the sun, all green parts of plants exhale oxygen; and that, on the contrary, during the night, or when in darkness, they give off carbonic acid. Oxygen is obtained by the decomposition of the carbonic acid contained in the sap, which the plants have drawn from the soil or absorbed directly from the atmosphere through their leaves. Under the influence of light, the oxygen of the carbonic acid is liberated, and the carbon fixed in the tissues of the plant, entering itself into fresh combinations, termed proximate principles. Although plants exhale a certain proportion of carbonic acid under the conditions here indicated, and perhaps also under other conditions, the quantity of oxygen disengaged is greatly in excess, as the immense annual growth of wood in all parts of the world goes to prove. In fact, it is beyond dispute that plants are mainly instrumental in preserving the equilibrium of the constituent parts of the atmosphere by their decomposition of the carbonic acid respired by animals, and restitution of the greater portion of the oxygen to the air.

All parts of plants naturally deprived of light, as roots, tubers, rhizomes, etc., do not themselves fix the carbon contained in their tissues, nor become green; but it is assimilated for them in the leaves, and returned through the circulating channels. Nevertheless, these parts when partially exposed to light become green, and are capable of elaborating their sap. There is a considerable variation in the degree of light required by different plants to enable them to form the chlorophyll, or green colouring matter common to most vegetable organisms, of which carbon is one of the chief ingredients. For the greater part, direct exposure to the sun in a climate suitable to their nature, other things being equal, is necessary for the perfect development of plants. But Ferns, and some other plants, will flourish and reproduce themselves in semi-darkness. This well-known action of light and darkness on plants is taken advantage of by gardeners in blanching Endive, Soakale, etc., and thereby rendering them more fit for food,

as this process not only changes the colour of a plant, but also greatly modifies its other secretions.

The sources of nitrogen and many other constituents of the ternary and quaternary proximate principles of plants, and by what agencies these combinations are effected, are subjects still engaging the attention of scientific men.

§ 2. Climate, its Influence on Vegetation.

Vegetable organisms, more than animal, and especially than man, are subject to the influences of relatively slight deviations of both heat and cold in diverse degrees, according to the climatal conditions of their natural habitats. Taking those plants in general cultivation for our guide, an access of heat beyond what may be termed normal seems to be less injurious than an increase of cold. But even heat above the temperature natural to a plant will eventually kill it, though its action is slow in comparison with that of cold. Frost is very decided and rapid in its action, its effects being visible almost immediately after a fall in the temperature. This peculiar susceptibility is only understood by its results, though doubtless an explanation must be sought in the differences of organisation of species restricted to different ranges of temperature. It is now almost universally conceded that by no process of acclimatization can we succeed in making a plant frost-proof, even to the extent of a single degree. Under otherwise favourable conditions, it is true, a plant will withstand a somewhat lower air-temperature than it is subject to in a natural state. To illustrate the certain and unchangeable effects of temperature on plants, we need only mention such familiar examples as the Potato and the Dahlia. We mention these because they have been under cultivation with us for a long series of years, without producing any visible or appreciable alteration in their constitution, in so far as it concerns their power of enduring cold. From the same cause, acting inversely, it is difficult, and in some cases impossible, to grow mountain and arctic plants successfully; that is to say, to keep them alive and in health for a number of years. In this case, perhaps, the actual increase of temperature is less injurious than the lengthened growing period to which plants from colder regions are subject under cultivation in this country; but, after all, this is a distinction with

scarcely a difference. In practice, it is well known that the various plants employed for the summer decoration of the parterre have each and all of them clearly defined constitutions. One or two degrees of frost for the shortest period will kill some plants outright, and the same species will succumb to a continued temperature many degrees above the freezing point; whilst other species will bear five, ten, fifteen, twenty or more degrees respectively without sustaining any permanent injury. The common Groundsel, and several other early-flowering somewhat succulent plants, will bear as much as forty degrees of frost for a short time without receiving any permanent injury. From the existence of these natural laws, it will be apparent that only those plants from countries enjoying a similar climate to our own will flourish in the open air all the year round without protection.[1] Plants, it has been observed, will bear a lower air-temperature, under certain favourable conditions, than that to which they are normally exposed. These modifying conditions are, the nature of the soil and the situation, governed by the quantity of moisture in the soil and atmosphere. But we shall return to the consideration of this question when we come to treat of soils. It is evident from what we have said, that the average annual rainfall, winter and summer temperatures, and the extremes of heat and cold of different parts of the country, are, to a limited extent, a guide to the gardener as to what plants will succeed in his particular locality. Speaking generally, the farther southward and westward we get in Britain, the higher is the mean winter temperature; but there are quite local conditions, favourable or unfavourable, that render calculations based entirely upon the temperature and rainfall of a district almost valueless. These are chiefly dependent upon the nature of the soil and subsoil, and the altitude and inclination of the ground. One great modifying influence on the winter temperature of the south-western coast, especially of the British Isles, is the warm ocean stream that flows from the Mexican Gulf and washes our shores. To a smaller extent, this holds good for the whole country. As compared with the same latitudes on the continent, our winters are milder, and our summers some degrees colder. And, by way of compensation for our cloudy skies and frequent rains, we

[1] In the Introduction, a few remarks on the Geography of Plants hardy in Britain will be found, with indications of the principal countries whence we obtain our hardy exotics.

enjoy the delights of luxuriant verdure all through the heat of summer; whereas in many other parts of Europe vegetation is scorched up. The disadvantages are also important, especially a deficiency of solar heat for the maturation of fruits and seeds of many plants. There is a great divergence in the direction of the isothermal lines in summer and winter for the British Isles. The general direction of the summer lines is from west by south to east by north, with a slightly higher temperature inland in the centre and south of England; whilst the winter lines run nearly parallel with the east and west coasts. The mean summer temperature ranges from 63° or 64° in the south of England to 55° or 56° in the north of Scotland; and the mean winter temperature ranges from 37° on the eastern coast and inland, to 39° on the north-west and south-east coasts, and upwards to 43° or 44° in the south-west. But winter extremes, more than winter means, affect the gardener; and when the thermometer falls below zero the frost is very destructive. In round numbers, the mean annual temperature of the British Isles is about 50°, but it varies in different localities from 53° to 47°. The higher summer temperature of the east and centre raises the mean annual temperature considerably; but the difference of six or seven degrees in the mean winter temperature of different parts of Britain and Ireland, to say nothing of extreme degrees of cold, goes farther to determine the question whether certain plants can be grown in the open air without or with only slight protection in winter. Although the mild and comparatively equable climate of the south-west of England and the south of Ireland is favourable to the existence of tender subjects such as will not withstand the climate of the centre and east, the higher summer temperature of the last-named region, coupled with less rainfall and more sunlight, is of far more importance to the fruit and seed grower. Many plants that flower freely in the moist uniform climate of the south-west do not ripen their fruits; whereas the more continental summer of the centre and south-east is sufficient to bring them to maturity. There is a still greater disparity in the average annual amount of rain falling in different parts of the British Isles. The greatest fall is in Ireland and on the western coast of Britain in mountainous districts, gradually diminishing eastward, and reaching its minimum in the south-eastern counties. The average annual rainfall in Ireland and hilly regions in the west of Britain ranges from 80 to 150

inches, and in some localities even this large amount is exceeded, especially in the western Highlands of Scotland and in Cumberland. In less elevated parts of the west, it ranges from 30 to 40 inches, and in the east and south-east from 20 to 28 inches annually. During a period of forty years, the average rainfall at Chiswick, near London, has been about 23·5 inches. But these figures, by themselves, are of little use to the gardener. It is only when they are compared with those furnished by the countries whence we obtain our hardy exotic plants, and with purely local conditions, that they become really interesting and serviceable. As we have already stated, the insular position of Britain, and especially its exposure to the softening influence of the Atlantic Ocean, raises its mean annual temperature considerably above that of continental countries in the same latitude. The most important point in this increased mean annual temperature for latitude, is the fact that it is principally due to the high winter temperature of those parts most favourably situated for receiving the full effect of the neighbouring ocean. The mean annual temperature of Britain in round numbers is 50°. Now, if we follow the lines denoting this mean temperature through the different countries of the world, both in the northern and southern hemispheres, we may form an approximate idea as to what countries will furnish us with hardy plants. In continental countries where this mean is raised considerably by a higher summer temperature, we may safely conclude that plants growing several degrees south or north of the line will prove hardy in the warmer parts of Britain. Again, insular countries on the same line, owing their mildness to the same causes as Britain, would naturally furnish us with plants that would flourish with us in some parts, whilst in others they would succumb to the rigours of winter. Another circumstance to be considered in conjunction with those already mentioned, in judging of the hardiness of a plant, is the elevation above the sea at which it grows in its native country. The rule for calculating for elevation is to deduct one degree of mean annual temperature for each hundred yards of height. As a rough guide, we may indicate the course of the north and south isothermal lines through those countries having a mean annual temperature of 50° Fahrenheit. But we must caution the reader against taking them as absolute and definite in the information they convey.

The northern isothermal line of a mean annual temperature of 50° enters England on the eastern side in 51° 51′ N. lat., and proceeding to the north-west, leaves it in about 53° N. lat., passing through the centre of Ireland, and onwards nearly in the same latitude, across the Atlantic, to about 40° W. long. From this point it forms a gradual curve southwards, until it reaches the American coast, in about 42° or 43° N. lat.; thence onwards, leaving the lake district to the north, in about 41° 50′ N. lat., and then again taking a northerly direction until it reaches 50° on the western side of the continent. In the Pacific it stretches still farther to the north, reaching 55° N. lat. in 160° W. long. Returning to England, and following the line eastward, we find it touches the continent of Europe on the coast of the Netherlands, turning gradually to the south as we travel into the interior, along the north shore of the Black Sea, across the Caspian in about 45° N. lat., through Tartary, Mongolia, Mantchouria, and the Japanese Islands, in about 43° N. lat. In the centre of the American and Asiatic continents, the high summer temperature brings the mean annual of 50° much farther north in proportion to the cold of winter as compared with the climate of Britain. But although plants growing a considerable distance south of the mean annual of 50° in these countries are hardy with us, they do not ripen their seeds, and some shrubs and trees rarely flower. The two most interesting regions on the 50° line to the gardener are the western coast of America and the eastern coast of Asia in North China and Japan, for from these countries we get a large number of plants chiefly hardy in the south-west, but requiring protection more or less in other parts of the British Isles.

The course of the southern isothermal line of 50° is much more uniform, as it passes through no broad expanses of land. Roughly speaking, we may put the latitude at 45° S. It includes the southern part of Patagonia in South America, and the extreme south of the middle island of New Zealand, a very small tract of country indeed, in comparison with that traversed by the northern line of the same annual temperature. And as these countries, from the same causes as our own, have a high winter mean, they offer few plants that can be successfully cultivated in the open air in Britain.

The mean of 40° for January passes through the centre of Britain, and in both Asia and America it deflects southward to 39° N. lat., or about 3° farther than the mean annual of 50° Fahr.

The rainfall varies throughout these countries proportionate to their extent in the same ratio as in the British Islands, and according to local influences; but as we have records for a few localities only, we forbear giving them.

One more observation should be made respecting the foregoing figures—that they must be treated as rough approximations, both those relating to temperature and to latitude. And we may here repeat, that the cultivator's special study should be the soil and climatal conditions of his own locality.

§ 3. Soils, their Nature and Composition.

So much depends upon the nature of the soil affected by different plants, that we should like to devote much more space than we have at our disposal to the consideration of this question. Under the most favourable climatal conditions many plants have no chance of flourishing unless they are supplied with, or placed in, a suitable soil. It is true that a vast majority of plants will succeed in any ordinary, free, tolerably rich soil; but, on the other hand, there are others that prefer a light dry soil, a rich heavy moist soil, or a peaty soil, and so on.

According to the composition of the soils, the greater or less will be their power of absorbing and radiating heat, and retaining or discharging moisture. In other words, a soil may be either a good or bad conductor of heat; and evaporation and downward drainage of water will be either slow or rapid, in proportion to its density and depth. It is obvious, therefore, that the extremes of these conditions—though both are suitable for certain classes of vegetation—are alike uncongenial to the majority of ornamental plants in cultivation. From observations in Scotland,[1] over a period of nine years, the temperature at three inches below the surface has fallen to 26°·5 in loose sandy soils, and at a depth of twelve inches the freezing point has only once been registered. In clayey soils, on the other hand, the lowest temperature at three inches was 28°, whilst at twelve inches it frequently fell to the freezing point, and once even 32° was recorded at a depth of twenty-two inches. Hence it follows that a moderately light porous, sandy soil, being a feeble conductor of heat, and readily parting with its moisture by evaporation and drainage, is eminently adapted for tender shrubs, bulbous plants, &c. A heavy

[1] Buchan, 'Handbook of Meteorology.'

adhesive soil retains an excess of moisture for many plants in wet seasons, and during a period of drought contracts and hardens as evaporation goes on, and opening in broad deep fissures permits the escape of moisture to a still greater depth than a loose soil.

Ordinary alluvial soil contains, according to its quality, more or less of the materials consumed by growing plants, such as alkaline oxides (lime, aluminium, potash, &c.), almost always in combination, as neutral salts, with carbonic acid (carbonates), silicic acid (silicates), and sulphuric acid (sulphates). Phosphate of lime and carbonates of iron, copper and other metals, and soda occur, besides many others, in small quantities, little influencing the cultural operations. Besides the foregoing inorganic constituents, the soil embodies more or less decayed remains of vegetables and animals that have lived upon or in it. This detritus, which has received the name of *humus*, and which imparts a dark colour to the soil, is more or less rich in phosphate of lime, as well as nitrogenous and carbonaceous substances, and their presence in abundance indicates a fertile soil.

Soils are usually divided into three primary groups, namely, argillaceous, calcareous, and silicious, according to the predominance of clay, lime, or silica—the latter in the form of sand, resulting from the disintegration of granite rocks or sandstone. These substances are rarely found in a state of absolute purity, being usually mixed in some proportion. But the preponderance of one over the others is sufficient to give the name to a soil, and indicate its particular qualities.

Pure, or nearly pure clay is a compact, heavy earth, soft to the touch, and impervious to water. It dries with difficulty, but will acquire excessive hardness from long exposure to the sun. In this state of purity it defies all attempts at cultivation, and even with from 12 to 15 per cent. of silicious and calcareous matter it is equally intractable. A soil into whose composition clay enters to the extent of 40 per cent. would be termed argillaceous, but in this proportion it would be suitable for the cultivation of many things. Argillaceous soils are naturally more tenacious and difficult to work in proportion to the quantity of clay they contain. The soils belonging to this group are commonly designated heavy or stiff soils.

Lime or calcareous matter results from the attrition of marble and limestone rocks (carbonates of lime). In a state

of purity it is white, and receives the name of chalk. In this state it constitutes a poor soil, absorbs little heat from the sun's rays, dissolves under the action of rain, blisters and flakes from frost, laying bare the roots of plants growing upon it. Earth containing from 40 to 60 per cent., the remainder being composed of equal parts of argillaceous and silicious matter, is termed calcareous, and is generally very favourable for cultivation. It thus constitutes a light soil, easily worked; but a larger proportion of lime renders it very adhesive when moist.

Silicious, or sandy soil is diametrically opposite in its physical qualities to argillaceous soils. It is rough or gritty to the touch, light, friable and loose, permitting the passage of water with great facility, drying with the slightest sunshine, and rapidly accumulating heat. Pure silicious sand, such as results from the disintegration of sand-rocks, is in its nature quite unproductive; but if mixed with a certain proportion of humus, and especially if it contain from 15 to 20 per cent. of argillaceous and calcareous matter, it is suitable for the support of many plants. A warm, poor, well-drained soil of this description is eminently favourable for the growth of tender subjects. Fine silicious sandy soil, with sufficient humus or vegetable mould to appear brown or nearly black, plays an important part in horticulture under the name of peat-earth. On account of its lightness it is admirably adapted for raising small seeds, but frequent waterings are necessary in consequence of the facility with which it dries up. It is, moreover, the only soil suitable for the culture of plants that grow naturally in peaty or boggy places, such as Heaths, Rhododendrons, Azaleas, and the Ericaceæ generally, and a few members of other families, collectively known as American plants, though in point of fact many of them are not of American origin.

Combinations of the three principal elements above described vary exceedingly in their relative proportions, and also by the addition of other matters which modify their physical properties. Hence the term mixed soils, as applied to the soils designated, according to their composition, argillo-arenaceous, in which lime is almost wholly wanting; argillo-calcareous, consisting mainly of clay and lime; calcareo-silicious, nearly destitute of clay. Ferruginous soil receives its name from the presence of a large quantity of carbonate of iron, giving it a reddish tinge. But these secondary distinctions are of little importance in practical gardening, as the soil, on

account of its limited area, is almost always so greatly modified by improvements and the addition of manures.

Besides this primary division of soils according to their constituent parts, there is another distinction to be considered, namely, in regard to the nature of the upper layer, or surface soil, and of the stratum immediately below, termed the subsoil, or subjacent rock, as the case may be. The surface of arable soil ranges from an inch or two to several feet in thickness, and is equally variable in the class of vegetation it will support. Greater importance perhaps attaches to the nature of the subsoil than is usually accorded to it, for on this depends the necessity or otherwise of artificial drainage, and the choice of trees, shrubs, and herbs that will permanently flourish in certain situations. Its thickness, as well as its mineralogical composition, is, of course, indeterminate. It may consist of solid rock, or beds of gravel, sand, &c., or it may also be composed of soil suitable for cultivation, and will thus serve to enrich the surface layer when it has been more or less exhausted by the crops taken from it. In the case of a heavy, impervious clayey subsoil, artificial drainage is beneficial, or, as in some instances, indispensably necessary to ensure success to the cultivator.

It comes within our province to say but little respecting the improvement or enriching of ground by the addition of natural and artificial manures. To effect this object it is obvious that the nature of the soil to be manured should be considered ; for some manures or moulds that would improve a heavy loam or clay would deteriorate the quality of a light sandy loam, and *vice versâ*. Another thing to take into consideration is the use to which the ground is to be put. Luxuriance in the growth of some things is undesirable, as for instance in small shrubberies, and where tender subjects are planted. And then different subjects delight in different soils. A lawn rarely requires any stimulating manures, as they induce the growth of coarse herbage. We have seen a good piece of grass spoiled by the injudicious application of liquid manure. Except for hot-beds and the purpose of mulching the surface of the soil around newly-planted shrubs and trees to diminish the amount of evaporation in dry hot weather, little use is made of what is termed green dung in the pleasure-garden. Thoroughly rotten leaves (leaf-mould), fibrous turf, and farm-yard manure, wood-ashes, soot, lime, sand, &c., are employed according to

the composition of the soil and its deficiency in certain desirable constituents. Inorganic, or purely artificial mineral manures, are seldom needed save where the crops are taken off the ground, in which case it becomes necessary to replace some substances taken from the soil. The principal thing to bear in mind in manuring is the fitness of the manure used for the soil it is wished to improve.

Vegetation is soon scorched up where the soil is sandy and shallow; but where there is a good depth of sandy loam, the quantity of water is more uniform throughout the year; neither an excess in winter, nor relatively so great a deficiency during a dry summer. Much may be done by deep and thorough tillage and frequent breaking of the surface to render heavy soils more productive, because the water will thereby be drained from the surface when there is an excess, and attracted towards it when there is a deficiency. The greater the amount of evaporation the lower the temperature; thus natural or artificial drainage affects the soil in two ways by relieving it of its superabundant moisture. It is important to bear in mind that a light soil, although exposed to greater extremes of temperature at and near its surface, maintains a higher temperature below a certain depth, and also that there is less evaporation from its surface. These two conditions materially modify the effects of frost, and are of as much importance to the practical horticulturist as the strictly climatal peculiarities of a district.

§ 4. Cultural Directions.

1. *General Remarks.*

Gardening operations are so multifarious, and the circumstances under which they are performed are so varied, that many large books have been written treating of them in detail, for the instruction of gardeners and amateurs. Perhaps the greatest fault of all or nearly all works of this description is their size, and the length at which the simplest matters are treated—usually with such minuteness of detail as to bewilder and discourage a beginner and cause him to throw aside a work that might in many instances be of great service to him. It is idle to attempt to teach practical gardening or any other branch of industry from the beginning by written instructions.

Nor is it necessary, for every one engaged in it, either for a livelihood or otherwise, must have the assistance of a competent practical teacher, and gain his experience by active participation in the different branches, coupled with observation. Not to be misunderstood on this point, we may add that we allude to every-day operations, and that we in nowise include information that otherwise would not be attainable by a great majority of gardeners. Our remarks are directed against those voluminous treatises that contain a small quantity of valuable matter mixed up with tedious and verbose descriptions and directions of no real utility to the young gardener in search of knowledge. A few general rules and hints relative to the most important points to be observed in carrying out certain kinds of labour are likely to be more serviceable than a large book to a great number of men: in the first place, because they are more likely to be read; and in the second place, because whatever may be new to the inquirer is more likely to be retained when divested of superfluous words. We do not adopt this view in consequence of the limited space we have thought sufficient to devote to this portion of our work, but from the inconvenience we have experienced ourselves in consulting big books. The exercise of forethought and care in all operations is what we would most strongly impress upon young gardeners, and remind them that they have to deal with living organisms. Anything with life if thoughtfully studied is calculated to afford much enjoyment beyond that offered to the eye, and for this reason we cannot refrain from endeavouring to enlist the sympathies of those whom this fact has failed to interest, though it may appear uncalled for to the comparatively few in whom this feeling has not remained dormant. Life is a subtle and undefinable principle alike in plants and animals; and, as the gardener's whole attention is directed towards maintaining healthy existence in his subjects, he is more likely to effect his object by always bearing the fact in mind that plants do possess life. This will lead him to study the conditions most favourable for the development of different species, and this knowledge he may gain by observing plants and trees in a wild state. Not that wild plants are always or even generally found in the most suitable situations where all the conditions are favourable to their development. But a wild tree, naturally sprung up from a seed, has often an advantage over a planted one, when other things are equal, because it is exactly the proper depth

in the ground in respect of root and stem. For by far the greater number of species this condition is essential to produce healthy flourishing trees. Certain trees, it is true, such as many Poplars and Willows, will succeed if subjected to the roughest usage in planting, but these are species which readily produce roots from any portion of their stems. It is a well-known fact that large Willow poles will strike root if thrust into the ground where there is sufficient moisture. But deep planting is one of the principal causes of stunted growth, early decay, and even death itself; sometimes it happens through inadvertence, but very often to save the trouble of securing a tree in its proper position by means of stakes and other appliances. It may seem almost incredible that a man should plant a tree a foot deeper than it ought to be in order to make it stand firmly, but it is so; and frequently the roots are treated with as little respect as the stem. In the first place, they are carelessly mutilated in lifting a tree, then exposed to drying wind for several hours perhaps, and finally bruised and crushed by the barbarous practice of stamping the earth down upon them with heavy nailed boots. Probably the tree may grow in spite of all this ill-treatment; but it cannot be doubted that it would flourish much better if the work of transplanting were carefully and skilfully performed.

The losses and disappointments occasioned by inattention in planting exceed all others put together. A tree is not so much injured by not being planted quite so deep as it would naturally be, as it is by being planted too deep. The points from whence the roots are given off, or where the root begins, should be barely covered, and when large holes are dug and refilled with mould, this should be allowed to settle down before the tree is planted, or the tree should be planted considerably above the surrounding soil, to allow for a certain amount of subsidence. Every root should be secured, not exposed to the air or sun longer than is possible, and carefully spread out in replanting. The soil should be gradually filled in, and where pressure is necessary it should be gentle and with plenty of soil between the foot and the roots. When once planted, a tree should be immediately fixed in its proper place by means of stakes and soft bandages; or if large, wires with india-rubber rings from some point above the middle of the stem, stretched outwards and fixed to dwarf stumps. Ligatures should never be too tight when first put on, and to prevent a tree from being permanently

injured by overgrowing them, they should be renewed once a year at least so long as they are necessary. Where possible, deciduous trees and shrubs should be transplanted in early autumn, before the soil becomes very wet, especially if of a tenacious nature, and then, unless the following summer be unusually dry, or the trees large, they will need very little attention in the matter of watering, on account of their having formed new rootlets. Most evergreen trees and shrubs may be transplanted with safety almost at any time of the year if removed with a ball of earth; but early autumn or late spring are on the whole the best seasons to select. Coarse-rooted trees and evergreens without balls of earth attached to their roots require much more attention to ensure success in removal. But in the case of valuable shrubs and trees, it is usual to prepare them for a year or two beforehand, by taking out a trench around them at about two or three feet or more from the stem, according to the size of the tree; in this way the roots are cut through, which causes them to branch out and fill the soil immediately around the stem. If the tree or shrub has never previously been transplanted, it is advisable to dig underneath it on one side to cut the tap-root asunder which most species produce when raised from seed. Firm staking and a little mulching with rough stable-dung are worth more than frequent doses of water, and shading during very hot or drying weather with moistened mats is very beneficial for evergreens when they have been transplanted with little soil. Another important consideration in planting is the selection of species suitable to the soil and situation. Under the heading Classification of Plants some information on this point will be found. Neglect of this rule is the explanation of our finding what would be handsome examples of choice subjects in crowded or concealed spots. The size a tree or shrub will attain is in most instances easily ascertained, and this done, the necessity of cutting down because they are too large for the situations they occupy may be avoided. Overcrowding trees and shrubs in planting is to be deprecated. Thick planting may be resorted to to produce immediate effect, or for the sake of mutual shelter; but the plantations should be gradually thinned out as the plants grow, or the result will be a dense thicket, and in course of time the most undesirable species may kill many of the others.

It is a very common practice in planting trees in park and

woodland to dig a hole about two feet square, and a foot or eighteen inches deep, and in planting the trees the spits taken out are often imperfectly broken up. On light, friable, well-drained land this method may answer very well; but on a stiff clayey loam the holes should be larger, for two reasons: firstly, because in very wet weather a small hole is liable to become a basin of water; and secondly, because in very dry weather there is not sufficient broken soil to retain the moisture needed by the tree. A little extra labour in planting is never thrown away.

The practice of pruning and clipping shrubs into fantastic shapes happily belongs to a bygone time; the use of the knife and shears is now usually restricted to thinning out and removing odd branches of ornamental shrubs and trimming hedges. Where shrubs are pruned it should always be done with the knife, and in such a manner as to leave them with a natural appearance. Clean cutting is more agreeable to the eye, and less hurtful to the tree, as the wound readily heals over. Dead branches should be cut off neither too close to the main stem nor at a distance of several inches; if cut almost close to the bark of the stem or parent branch, and the tree be otherwise healthy, the wound will soon be grown over; but if at a distance, the bark cannot cover, and consequently decay often continues, and penetrates into the centre of the main branch or stem, ultimately causing its death.

Where under-drainage is necessary, or where sewage conduits are carried through a garden, they should be so contrived as to be as far away from the roots of trees as possible, or it eventually comes to the destruction of either drains or trees. It is not unusual to lay them by preference in the roads and walks, but this is not always practicable. Flange or socket pipes should be used to prevent as much as possible the intrusion of roots.

The operation of laying turf, though requiring comparatively little skill, is frequently badly performed owing to the prevalence of the erroneous impression that thick turves will succeed better than thin ones. The ground may be properly levelled with a sound, firm bottom, and a little crumb on the surface to receive the turves; but if they are cut too thick, and especially if dry weather set in, the result will be very unsatisfactory. A sod can scarcely be cut too thin, for the thinner it is the sooner the herbage will form new rootlets in the fresh soil. Besides, a thin sod is more elastic, will beat out, and cover more space than a thick one.

The cultivation of herbaceous plants calls for more skill and management than that of trees and shrubs, because there is a greater diversity in their habits, habitats and special requirements, and because they are more exposed to the vicissitudes of weather, and the attacks of insects and animals. And then the work in the flower garden proper has to be repeated year after year, and upon its skilful execution depends the amount of pleasure derived from this the most attractive part of the garden. Consequently we shall devote a special chapter to the explanation of the best methods of raising, treatment, and propagation of herbaceous plants, including also a few hints on the management of flowering and ornamental shrubs requiring special conditions.

We may here say a few words on the general propagation or multiplication of plants. There are two distinct modes of raising plants, namely, sexual, from seed; and asexual, which includes all the different methods of grafting, budding, layering, offsets, division, and also propagation by cuttings, etc. The most important means of propagation practised by gardeners on a small scale are from seeds, cuttings, and root-division. These three methods represent the raising of annual plants, and the multiplication of tender bedding plants and herbaceous plants respectively. Grafting, budding, layering, etc., are practised on a limited scale only, or not at all, by the small gardener or amateur, and, to a certain extent, more for recreation or experiments. But advantage should be taken of these means to increase the stock, or propagate rare varieties, where desirable. Otherwise these operations on an extended scale are restricted to nurserymen and florists. Budding is the method generally employed in the propagation of Roses, and variegated, double-flowered, weeping and other varieties of ornamental trees and shrubs. Usually some common or vigorous-growing species is selected for the stock upon which the rarer varieties are budded. For the Rose stock, clean stems of the common Dog-Rose; for weeping and other varieties of Ash, the common Ash; for various species of Cytisus and Genista, as well as improved varieties of Laburnum, the common Laburnum; and so on, always selecting a species of close affinity.

Of late there has been a tendency on the part of horticultural writers to depreciate this and that, till there is almost nothing left for the garden. One objects to variegated plants, another terms weeping trees abnormal and unnatural, whilst a

third would exclude standard Rose-trees from the garden, to say nothing of the difference of opinion regarding the different styles of flower-gardening. But this should not deter planters from employing these things in moderation, and in appropriate situations. An excess of variegated plants, or a garden full of standard Roses, should be avoided, as well as any other inconsistency; and few persons would think of forming a plantation of weeping trees, such as one occasionally sees in a burial ground.

It is unnecessary for us to describe the process of budding, as it is one of the first things to which a young hand takes a fancy; but we may caution the inexperienced to loosen the ligatures before they have injured the growing bark. The incision should not be made deeper than the bark, nor longer than the inserted bud. For standard Roses, the buds are better inserted in the lateral branches, as close to the main stem as possible, than in the main stem itself, as they form more equal-sided heads. Dwarf or bush Roses are either grafted, or budded, or on their own roots. Plants of the latter description are preferable, as there are no foreign suckers developed; but some varieties do not succeed so well on their own roots as they do when worked upon a more vigorous stock. The Rosa Manetti, a variety of unknown descent, is usually employed as a stock for dwarf Roses. Like most of the climbing Roses, it readily strikes root from cuttings in the open ground. Ornamental shrubs and trees are usually budded in the main stem of the stock, which should be cut off immediately above the inserted bud as soon as the latter has made a shoot from six inches to a foot long; and the shoot being trained upright will form a straight stem, and quickly overgrow the point of union. Weeping and some other trees grown as standards are worked on stems of convenient height, according to what is desired. The season for budding depends entirely upon the weather; but any time when the bark separates freely from the wood will answer. Roses, if budded during the first growth, frequently start, and even flower, the same season; but the buds of most other things remain dormant until the following spring.

Layering is resorted to for those trees and shrubs that will readily root in this way, but which are not sure from independent slips or cuttings, such as the Elm, Lime, Laurustinus, Aucuba, Portugal Laurel, etc. This operation is very simple: the branches of the parent plant being bent down, partially severed, and fixed in the soil, where they will strike root in one

or two years, according to the nature of the species. Many shrubs and trees are readily raised from cuttings in the open ground in a partially shaded place. Such are Poplars, Willows, common Laurel, hardy Roses, Ribes species, Ivies, Privet, Virginian Creeper, etc., etc. The ground should be well prepared for cuttings, and if of a heavy nature, a little sand placed in immediately around the cuttings, care being taken to press the soil firmly against the cuttings, especially at the bottom. Most of the Coniferous shrubs will strike from cuttings, though nearly all of the arborescent species form handsomer specimens from seed; but a cold pit or greenhouse secured from frost in winter, and kept cool and shaded in summer, is necessary to raise them, as they are several months, or even more than a year, some of them, before they produce roots. Pots are preferable for this purpose, half filled with drainage, a layer of good free mould, and a layer of sand sufficiently thick (from one to two inches) that the heel of the cutting just reaches the mould. The whole must be very firm, and unceasing attention in watering is indispensable, for too little or too much are equally fatal. Cuttings of common Laurel and Box may be put in during the Autumn, but Ribes, Ivy, Climbing Roses, and most other subjects are better left till the end of Winter or beginning of Spring; and then, if sharp frosts follow, the cuttings should be pressed down again, as the frost often draws them out of the ground, or more or less raises them from their original position. Short-jointed, well-ripened wood should be chosen in all cases, as it produces roots more freely and forms stronger plants in a shorter period. Cuttings of Roses, Ribes, etc., should be taken from shoots of the previous year's growth. From eight to twelve inches is a good length, and they should be inserted at least four inches in the ground; Laurel and Ivy cuttings are preferable with a heel or small portion of the older wood. The former should be from a foot to eighteen inches long, the tip being cut off to induce the lateral buds to shoot; but the latter are quite as well when only a joint or two remains above ground. For Coniferous plants very short lateral branchlets, with a heel or small portion of the older wood, are best. The leaves should be carefully removed from the underground portion of all cuttings, and a sharp knife employed in preparing them.

Many shrubs and herbs may be propagated very rapidly by division, especially where, like the common Lilac, they throw

up a multitude of suckers, or, like the Arabis albida, they produce running stems, or stolons. Plants with rhizomatous or bulbous roots increase by division in the former case, and offsets in the latter. But we shall enter more fully into this subject when speaking of the culture of herbaceous plants.

Excluding many garden varieties, which cannot be perpetuated by sexual propagation, Oaks, Maples, Ash, Horse-Chestnut, Sweet Chestnut, Whitethorn, Larch, Spruce, and other Conifers, besides a host of other things, including free-seeding herbaceous plants, are raised from seed.

Plants, as well as animals, are subject to a great variety of accidents and diseases, the ravages of parasites, of both the vegetable and animal kingdoms, and herbivorous animals; and in an artificial state more perhaps than when growing wild. The ill-effects of rapid and frequent fluctuations of temperature, unusually severe winters, late frosts, excess of rain or drought, storms and high winds, can only be guarded against to a certain extent. By choosing hardy species or protecting tender ones, efficient drainage, watering, and providing the supports required by different plants in good time, a great deal of the mischief likely to ensue from these causes may be avoided. Birds may enjoy perfect immunity in the ornamental garden; for here, whilst doing a great deal of good by clearing off destructive insects, they effect little harm, and afford, moreover, a great deal of pleasure to most people. The greatest scourges of the animal kingdom belonging to the larger class are rabbits and hares, rats and mice. The latter are very mischievous among seeds, and in winter they will destroy rare herbaceous plants by nibbling them away, so there is nothing for it but to trap them. Moles occasionally, but not often, get into the flower garden, whence they must be banished with all speed. Rabbits and hares are easily excluded by the use of wire netting made for this purpose. Wasps, hornets, and ants are all undesirable, more on account of their painful stings than anything else. Ants may be destroyed by pouring boiling water into their nests, or where this is impracticable from the vicinity of plants, inverted dishes smeared with honey will trap them. Wasps and hornets are usually suffocated in their nests at night by blowing the fumes of rags dipped in brimstone into their holes. But it is when we come to such pests as snails, slugs, caterpillars, grubs and lice, or green fly, that we meet with our worst enemies. The only effectual way of getting rid of snails, slugs,

wire-worms, and grubs, is to hunt them out and kill them outright; but lice and caterpillars and other parasitical insects may be kept under pretty well by syringing the plants attacked with tobacco-water, or a solution of some of the compounds manufactured for this purpose. Birds aid materially in diminishing the number of these injurious insects. Wasps and ants, but notably the different species of Ladybird (Coccinella) consume myriads of the green fly. The Lime, amongst trees, is especially liable to the ravages of caterpillars, but nearly all deciduous trees and herbs are subject to the attacks of different species. In the case of large trees, it is usually left to the birds to destroy them; but much may be done to stay the ravages, particularly of those species infesting Conifers that deposit their larvæ in large nests, by cutting off the small branches and burning them. Amongst reptiles, lizards and toads may be considered as the most useful, as they subsist entirely upon insects and slugs. And gold-fish not only add to the attractions of a lake or aquarium, but also serve to purify the stagnant water.

The havoc and devastation caused by parasitical Fungi exceed that caused by all other injurious agents, and where they have once established themselves, there is greater difficulty in dispossessing them than is the case with insects. There are many species or varieties, or what are now known in some cases to be different stages or conditions of the same species, constituting what is popularly called Mildew. It is still doubtful whether these Fungi attack perfectly healthy plants, or whether they are the effect of bad health, the cause being attributed to unfavourable conditions of temperature and soil, which produce decay of the epidermis and thereby expose the plant to the attacks of these parasites. However that may be, there are always accompanying unhealthy symptoms, and mildew is most flourishing in a cold cloudy season. There is, moreover, a great difference in the predisposition of different varieties of the same species (e.g. Roses) to the attacks of these insidious organisms; some are subject to mildew almost every season, whilst others as rarely betray a trace of its presence, even though growing in the midst of infected plants. This much is certain, that plants in a healthy, vigorous condition will outgrow the disease much better than stunted, weakly ones will. But of course this does not materially aid in the elucidation of the first cause of the appearance of these parasites on different plants.

Mildew in all its forms, if taken at an early stage, before it

has spread too widely, may be extirpated by the application of flowers of sulphur. Sulphur is, perhaps, more effective in its action if applied dry; but this being a tedious process, it is usually mixed with other ingredients in water, and the plants syringed with the mixture. Under glass, the remedy against red spider (a minute parasitical insect), namely, moisture, is favourable to the development of mildew; but if flowers of sulphur be mixed with the water, or placed on the hot-water pipes, there is little to fear from either of these pests. The red spider is never so troublesome in the open air, though in dry, hot seasons it sometimes does great damage. It is usually found on the under surface of the leaves, and increases with astonishing rapidity, soon covering the whole leaf, causing it to turn yellow and fall off. Some of the Junipers are very subject to its attacks, unless planted in humid places which are natural to them.

2. *Culture and Propagation of Plants belonging to the Heath and allied Tribes.*

Shrubs and trees requiring a peaty or boggy soil are commonly known as American plants, whether natives of that continent or otherwise. They include all, or nearly all, of the Ericaceæ and members of several other families, such as Berberis Bealii, and other species, Calycanthus spp., Escallonia, some of the Daphnes, Magnolia glauca, Spiræa spp., and numerous other evergreen shrubs, will flourish better in peaty soil, or with an admixture of leaf-mould. We might also mention that many herbaceous plants succeed best in a peaty soil. Reference is made to the fact under those species growing naturally in boggy places.

Although all of these plants prefer a prepared soil, there are some of them that will flourish in ordinary garden soil, if properly drained. And in the absence of peat, good leaf-mould and sharp sand mixed with the natural soil will answer for most species. Varieties of Rhododendron Ponticum, Kalmia latifolia, Azalea Pontica, Erica carnea, etc., etc., and Arbutus Unedo are the least exacting in regard to soil.

To cultivate peat plants successfully two conditions are indispensable; these are, climate and soil. In default of these conditions, all efforts will remain fruitless. With regard to climate, it should be remembered that all the species of this group are not equally hardy; hence the necessity of choosing

such as are suitable for the situation where it is wished to grow them. But temperature is not the only element of a climate. Humidity of the atmosphere and light are other elements which must be taken into account. Broadly speaking, we may say that all the Ericaceæ demand a certain amount of moisture in the air surrounding them. This moisture may have its source in the mists which frequently envelop the mountains where they grow; or it may be due to the vicinity of the sea, lakes, marshes, or water-courses. The site and aspect for these plants are also of great importance. For those species loving a marshy habitat, a low, flat, spongy soil is naturally the best; but these species are few in number and less generally cultivated than the others. All the other species prefer a sloping bank of eastern or northern aspect, but it should be sheltered from the winds. If, therefore, there are natural or artificial mounds in a garden, the shady side of these should be selected for planting clumps of Rhododendrons, etc. In the absence of small hills, raised beds can be substituted; but if the natural drainage be insufficient, a layer from six to nine inches thick of coarse gravel or some other open material will be necessary in a low situation.

The site having been selected, and the form of the plantations decided upon, the natural soil should be taken out to a depth of eighteen inches or two feet; and if the subsoil is of a heavy impervious nature, a layer of draining materials from six to nine inches thick put in at the bottom and filled up with peat, roughly broken but not sifted. This earth is thrown up into a mound high enough that after sinking it will still be a little above the general surface of the ground. The thickness of this bed will vary according to the size of the species it is intended to plant. It will readily be understood that a greater depth of soil will be necessary for the large-growing Rhododendrons than for those of smaller growth, and such as Heaths and Vacciniums.

In some parts of the country there is a difficulty in procuring peat, and, besides, a great deal of it is too poor to use alone with advantage. It may be enriched by the addition of thoroughly rotten leaf-mould with a little sharp sand, or a compost may be substituted for it consisting of equal parts of sand and vegetable mould. But the fibre of the peat being one of its important elements, no substitute can equal it. The top-spit of earth in an old wood is usually rich in humus and very

light, and mixed with sand is perhaps preferable to leaf-mould. Or it would serve well to improve the fertility of poor peat. In all cases the introduction of even the smallest quantity of farm-yard manure should be avoided, for of all plants these are the most susceptible, and contact with animal dung is either fatal or very injurious to the majority of them. Otherwise the more substantial the soil is, other conditions being equal, the better the plants will flourish in it. Nearly all the trees and shrubs coming under this category may be propagated from layers or suckers; but the garden varieties of Rhododendrons, etc., are usually grafted on the commoner forms. As a stock for Rhododendrons, R. Ponticum is generally employed, being very hardy and easily raised from seed or layers. R. Catawbiense is also occasionally used, but the hybrid varieties do not take so well on this as on the common one. The principal objection to R. Ponticum for the tender varieties is its earliness; but as only a few species, such as R. campanulatum, and R. argenteum, are said to succeed well on the other, it is generally preferred.

As an artificial soil in most cases is necessary, it is a common practice to plant these shrubs in masses, and from their bushy habit this method is very suitable and effective. After a bed is once established, little care is required. The removal of weeds and dead wood, and the yearly application of a thin layer of leaf-mould, are the principal operations. In very dry seasons, and especially where recently transplanted, copious waterings will be very beneficial.

3. *Culture and Propagation of Roses.*

A few words may be devoted to this popular genus, although as a rule its members require but little skilful attention after they have once been properly planted. But, like most other things, a little extra care in the different operations connected with their culture will be amply repaid by healthy free-blooming plants. Generally speaking, Roses may be said to flourish in any tolerably good garden soil, provided it be free and well drained. Deep tillage and generous applications of farm-yard manure are indispensable to obtain strong growth and fine blossoms. Liquid manure may be frequently given in summer with advantage.

The site for a rosary should be open, airy, and light, for Roses languish, and produce but little flower in a partially

shaded and confined place. Dwarf, thick hedges, or other shelter at a moderate distance from the beds are necessary in exposed situations, especially for protection against the south-west gales, during the flowering season. A rich, deep, loamy soil is the best for all purposes, and where the soil is naturally poor, the addition of good rotten dung will be sufficient to produce the most satisfactory results. Roses delight in newly-broken-up pasture land, where the turf is turned in; and for a season or two very little manure is necessary. They are now grown in various forms, according to the taste of the cultivator, or the exigencies of the locality. Leaving climbing and tender species out of the question, we have dwarf bushy plants, either on their own roots, or budded, or grafted on some other form close to the ground; and those with stems, varying from a few inches to several feet in height, and termed half-standard or standard. No rules can be given to guide intending growers in selecting any particular form, further than to remark that the situation and associations should be studied. In very bleak localities tall standards should be avoided in favour of dwarf bushes. As a rule, the finest blooms are obtained from dwarf plants, especially when on their own roots, and most of the vigorous-growing kinds will succeed in this way. Standard plants are suited for mixing in with dwarf shrubs or Roses, and also in some situations as single specimens in the centre of a bed; but groups of standard Roses have a very stiff and unpleasing effect. And, moreover, those budded on tall stems are much more liable to early decay. However, all of the different methods have their advantages, and properly utilised are desirable. The Tea, Noisette, and other tender Roses are better suited for covering dwarf walls, or grown as dwarf bushes where they can be protected; a light, warm, well-drained soil being indispensable to success. Besides those varieties specially employed for planting in beds or borders, either as standards or dwarfs, there are many climbing varieties adapted for clothing pillars, walls, banks, stems of trees, or festooning. Descriptions and other information will be found in the first part of this work.

To obtain abundance of flower, attention to pruning in accordance with the conditions of the different varieties is requisite. Nothing would seem more natural to the inexperienced grower than to prune freely where there is plenty of wood to cut away, and to spare the growth of the less vigorous; but

this is just contrary to the teachings of practice. In a general way we may say that the strong, vigorous-growing varieties should be sparingly pruned, whilst the weaker-growing kinds should be cut back almost close every season. The time for pruning is late autumn or winter; but tender varieties, when grown in the open garden, should not be cut back till the severity of winter is past. The best time for planting is November or December, though with a little care Roses may be transplanted up to the end of March, or later. There are various ways of propagating them, but the great majority of cultivated varieties are budded on stems of the Dog-Rose for standard trees, or on the Manetti for dwarf bushes. Climbing varieties may be raised from cuttings in the open ground, and even many of the Hybrid Perpetual class will succeed in the same way. To raise new varieties crossing is resorted to, and the seeds resulting therefrom are sown. The seedling plants would be several years as a rule before they produced flowers, and consequently as soon as the wood is large enough they are budded on the Dog-Rose or Manetti, by which treatment blooms are usually secured the following, if not the same, season.

4. *Culture of Herbaceous Plants.*

GENERAL REMARKS.

Under this head we include all plants that are herbaceous, technically speaking, whatever their duration, and whether bulbous or fibrous-rooted. At another place we give some short lists and hints to enable possessors of small gardens to select a few species worthy of a place in every garden. The general routine to be observed in the cultivation of herbaceous plants, excluding the strictly alpine species, is simple enough. A rich, deep, well-drained soil, tilled to a good depth, is the first condition. Where the soil is poor and shallow, means must be taken to improve it, for, with a few exceptions, herbaceous perennials require generous treatment. Turfy loam, mixed with leaf-mould and thoroughly rotten stable-dung, will be found the most effective for nearly all poor land. A stiff clay is perhaps the most unmanageable description of soil for a flower garden, as greater difficulty is experienced in working in material to make it freer. In such cases if practicable a spit of the clayey soil should be taken out and replaced by a suitable compost, the surface mould, if any, being kept back

and mixed with it. The method of planting will be determined by the taste and requirements of the cultivator. The principal considerations are: size and colour, and flowering season, and space for the introduction of bedding plants where it is desirable. There should also be some proportion in the relative size of the plants of different species. Free-growing species that soon cover a large space should be kept in check, and the more delicate ones encouraged by special study of their habits and peculiar likings. Thinning out of superfluous stems and supports where needed should always be seen to as soon as needful. The stakes or other supports used should be selected according to the respective heights of the plants, and as much hidden from view as circumstances will permit. If painted green, so much the better, as they are then less striking; but even common hazel or other stakes with the bark on are scarcely noticeable when properly put in. Nothing is more unsightly than the common practice of tying up the stems of a plant like a broom to a single rough stake standing a foot or two higher than the plant itself. One support or more may be necessary according to the habit of the plant, and in no case should they exceed the full-grown plant. Care should be taken to preserve the natural habit of each species. The best material for tying is bast or soft string. Much time is gained by performing this and many other operations as soon as the plants are sufficiently advanced; and not only time in this case, but likewise a better effect. For when plants are neglected, the stems spread out and lean in all directions, so that when they are tied up they remain unsightly for some time, even if they ever assume an elegant appearance, in consequence of the stems being crooked and the leaves twisted.

A large proportion of the perennials in general cultivation are easily propagated either from off-sets, cuttings, or seeds in the open borders; but that is not the case with many of those species which will not bear root-division, and whose seeds are very minute. The familiar Wallflowers, Pansies, Polyanthuses, Monkshood, Columbines, Antirrhinums, Michaelmas Daisy, Scarlet Lychnis, Arabis albida, London Pride, &c., owe, no doubt, some portion of their popularity to the facility with which they are increased. Where, as in the case of Antirrhinum, Polyanthus, Larkspur and Pansy, propagation is usually from seed, this should be thinly sown in beds or patches, not earlier than the middle of March, as it will then

quickly germinate and grow with more vigour, and thus form stronger plants, and escape, to a certain extent, the ravages of birds and insects. Propagation by division—the means employed to increase Arabis albida, London Pride, &c.—should be done in winter, whenever the weather is suitable. The principal hardy bulbous and rhizomatous perennials, such as Irises, Snowdrops, Crocuses, Tulips, Lent-Lilies, &c., also increase rapidly in favourable soil; but this class of plants will be treated of separately, as many of them require exceptional conditions to ensure their complete development.

A few words respecting the raising and treatment of the more delicate species may be useful; but knowledge of the peculiar habits of different plants, and consequent difference in treatment, must be gained by actual experience; and observation will soon supply the clue to proper treatment in most instances. Nearly all of the small-seeded plants, and those whose seeds usually lie dormant for a considerable period, as well as rare or small-growing species, require the shelter of a cold pit to raise them in, and afford them protection until they have attained sufficient strength to be transferred to the open ground. Ordinary frames placed where they will obtain abundance of light will answer all purposes very well. They should be shallow, and have a depth of about six to nine inches of coal-ashes, sand or tan, or other material in the bottom, for plunging the pots in, and thus ensuring effective drainage, so as to prevent the accumulation of water. Coal-ashes are as good as anything for this purpose, as they move freely and are unfavourable to worms, one of the worst scourges in seed-pots. The pots or pans used should have a good layer of sherds in the bottom to ensure perfect drainage, or the soil may soon become sour. For general purposes a compost of free loam, thoroughly rotted leaf-mould, or dung from an old hot-bed, and sufficient sharp sand to keep it from binding, will be found suitable. About one-fourth of leaf-mould or rotten stable dung will be ample, and if the loam be rich, a smaller proportion would suffice. Seeds should be covered with soil according to their size; a layer about their respective thicknesses may be observed as a general rule. Very minute seeds should not be covered at all, merely sown on the surface of the moistened soil, with perhaps a slight sprinkling of sand. A little extra sand on the surface may be recommended for all seed-pots, as it prevents the soil from forming a crust. A

little moss, too, is a very good thing to place on the top until the seeds begin to germinate, especially where the seed is near or on the top of the soil, as it secures the surface from being disturbed by watering, and prevents rapid drying. Careful watering, indeed, is of the utmost importance; for while much moisture with a low temperature is fatal to most things, seed-pots should never be allowed to dry up. After a seed has once started into life, its course cannot be interrupted with impunity, and until a plant has made considerable root it is wholly dependent upon surface moisture.

As has already been observed, there is a wide difference in the time occupied in germination, varying from a few days or weeks to twelve months or more, according to the species, and to some extent the age of the seed. The necessity of keeping the pots free from weeds will be obvious; but as these, in many cases, are very difficult to distinguish in a young state from the seedlings it is desirable to raise, we must endeavour to kill all seed that is in the soil before sowing very rare or choice kinds, or those likely to lie dormant for a lengthened period; this may be done by baking, not burning, the mould. The frame should have a thin shading all the time the sun is upon it, and very little ventilation is required until the plants are fairly above ground. It is best to have a second pit or frame to remove the seedlings to as they come up, because they will gradually need more air until they are finally planted out. Thick sowing is to be deprecated for many reasons, but chiefly because overcrowding gives number without constitution or vigour. The course to be pursued after the seedlings have attained a fair size will be determined by the season and the rarity of the species in question. After weeks or months of watching and nursing, it will be better to ensure success by getting them established in pots before turning them out into the open borders. A sharp look-out must be kept after mice, slugs, wood-lice, and other destructive animals and insects.

The management of plants in the beds and borders is so simple that it appears superfluous to add anything to what we have already said. The selection and disposition will vary according to the taste and time of the cultivator, and the extent of his garden. Delicate subjects should be avoided where there is little space and little time to devote to their cultivation. Dead leaves, flower-stems and weeds should be removed as they appear. The surface should be slightly moved by

raking or forking, but deep digging is unnecessary, and often destructive. To improve or renovate the soil, a surface dressing of leaf-mould or rotten dung may be applied if desirable; but the better plan is, if the borders have been properly prepared, to leave them alone for a few years, and then partially or wholly renew them, and transplant the whole of the occupants. Liquid manure should always be sparingly used, and reduced to a weak consistency, and only when such subjects as Dahlias and Hollyhocks are introduced is it desirable to resort to it at all for a tolerably fertile soil.

The successful cultivation of strictly alpine plants is a task of much greater difficulty, undertaken only by those who have the needful time and convenience. Many of them require the greatest skill and experience of their natural conditions; and some defy all attempts to keep them alive beyond a season or two. Artificial rockeries are erected with appliances to ensure good drainage and a cool moist atmosphere during the warmer months. And even then it is usual to grow the more susceptible species in pots, and plunge them, so that they may be transferred to a cool pit during the inclement season, when they are liable to damp off from excessive moisture. Nevertheless, there are many of the more vigorous alpine species that will flourish well in any ordinary free soil. It is chiefly the diminutive species, and especially those clothed with hairs, that are the least amenable to the artificial conditions inseparable from culture, and these peculiarities are alluded to in the descriptive portion of this work.

5. *Culture of Bulbous and Tuberous-rooted Plants.*

Although many of the species belonging to this class will flourish under the same treatment recommended for herbaceous plants in general, a great majority of them need rather more attention, and will not give satisfactory results unless their special requirements are studied. Amongst the least exacting are the Snowdrop, Spring Crocuses, White and Orange Lilies, Day Lily, Winter Aconite, Snowflake, Ornithogalum umbellatum, Muscari botryoides, Gladiolus communis, and the common Narcissuses and Jonquils; but even these prefer a free, tolerably rich soil.

The various modes of treatment adopted for plants with fleshy roots or rootstocks depend upon their hardiness, and the nature of their rootstocks. We will take the principal

groups in succession, and give a few simple directions respecting the planting, storing, etc., of the different kinds.

a. Culture of the Tulip and Gladiolus and their Allies.—The bulb of a Tulip is termed a tunicated bulb, from its being clothed with membranous scales. It never flowers but once, and attains maturity in about three years. A more complete description of its different stages of development will be found at pp. 495–6. From its solid compact structure it will bear storing away out of the ground for several months. This practice is usually resorted to where Tulips are used for bedding, as it then leaves the bed quite free for its summer occupants. But if the bulbs are taken up before the leaves have turned yellow, they are likely to shrivel and become useless, on account of their not having reached maturity. A better plan to pursue, perhaps, where they are bedded, and it is desirable to preserve the bulbs, is to plant them in such a manner as to permit of the summer bedding plants being placed between them. Sometimes they are taken up and replanted in another place to complete their growth; but they rarely turn out so well, even if the greatest care be exercised in their removal. In the mixed border they may be left undisturbed for three or four years, and then they can be lifted at the proper time, about the end of June. When they are taken up they should be exposed to the air in the shade until they are dry, when they may be stored away in any dark place free from dampness. They should be spread out on shelves; and the only other care needed is protection from mice. The best time for planting is from the beginning to the end of July, according to the climate of the locality. If planted too early they will start, and the leaves will be injured by frost. Tulips prefer a deep sandy loam, with an admixture of leaf-mould and rotten manure to give them vigour. But the most important condition is perfect drainage, without which the bulbs are liable to rot; and this may be said to hold good for nearly all bulbous plants. Where the soil is not naturally sandy, it is desirable to add a little sand with the other ingredients, and to place some immediately around the bulbs when planting them. The bulbs should be planted at a depth of about three inches from the surface of the soil. We need not enter into the question of colour and other considerations to be observed in planting, as we have gone into that in detail in another place. The same soil and treatment will answer

equally well for the Hyacinth, except that the bulbs should be planted a little earlier, and at a depth of about five inches. The Hyacinth bulb differs materially from the Tulip bulb, being polycarpic, that is, flowering more than once. The various species of Narcissus, Crocus, and many other genera may also be included here. The only deviation is in the period of planting and lifting, which varies for different species. The rootstocks of the tuberous-rooted English and Spanish Irises should not be kept out of the ground longer than is necessary, as they soon shrivel and lose their vitality. It may be mentioned here that the leaves of bulbous plants should not be cut off, even when the plants are left in the ground, before they have done their work and dried up; but the old flower-stems may be removed without doing any injury.

The numerous species and varieties of the showy genus Gladiolus in cultivation will succeed in a heavier soil than most of the plants of this class. But good drainage and rich soil are essential conditions to obtain fine flowers. Tulips, Hyacinths, and by far the largest proportion of bulbous plants, flower in spring; but the Gladioluses are all of them summer-flowering. The familiar G. communis and G. Byzantinus are quite hardy border plants, succeeding well in almost any soil. The hybrid varieties also will bear our winters if planted at a depth of six inches; but the common practice is to take them up as soon as the leaves begin to decay, and replant them again in early spring. Some time during the latter part of March or beginning of April is the best time for planting, and they may be lifted in October or November, according to the season. The bulbs should be thoroughly dry before they are stored away, and they require a dry airy place, where the frost does not penetrate. The bulblets which are so freely produced by some varieties will bear frost with impunity when they are young, and consequently they may be replanted in autumn. But as they reach maturity they become tender. They will flower about the second or third year, according to the treatment they receive. In any except very sheltered situations these beautiful flowers require support, or they are likely to be broken off by rough winds. The different varieties vary considerably in height, from about eighteen inches to three, or even four feet; but these particulars will be found in the descriptive catalogues of growers. We have said nothing as to distance of planting these and other bulbs apart, because this

depends entirely upon the object in view. Where it is desirable to grow fine strong flower-spikes for exhibition, naturally more space must be allowed; but for massing they are usually planted close enough to fairly cover the ground. In the former case, a foot or even eighteen inches apart each way is no more than sufficient. It is as well, where convenient, to change the ground for these and other bulbs, for they will flourish better in a fresh soil.

The culture of the numerous Cape bulbs, such as the species of Ixia, Sparaxis, Watsonia, etc., in the open air is very limited, and only practicable in favourable localities; a deep warm dry soil and a sheltered situation being indispensable. And then they must be planted about six inches deep to enable them to resist sharp frosts. But ever so little protection with dry litter or some readily portable material will suffice, and the brilliant and unusual combinations of colours displayed by many of them will amply repay the little extra labour they entail.

b. Culture of Lilies and their Allies.—The bulbs of Lilies, the Crown Imperial, and a few other subjects, differ materially from those described above, being composed of loose fleshy scales, and consequently of a much more perishable nature. It follows, therefore, that they should not be kept out of the ground any longer than is absolutely necessary, and if only for a short time they should not be exposed to a drying wind or heat. On the other hand, they must not be moistened. Covered with almost dry sand or moss, they will take no harm for a week or two. But in all cases where practicable, they should be replanted without delay. The operation of transplanting and lifting to obtain the offsets may be done at any time in the autumn after the maturation of the old flower-stems. It is better to do this when the ground is not very wet, as it will work much freer, and be more favourable to the growth of the bulbs. A very few of the many gorgeous species are in general cultivation, but the introduction of many fine new ones within the last few years has been the means of bringing them into more prominent notice, and they are already becoming very popular. The species commonly seen, and requiring no particular skill in treatment, are the Orange Lily (Lilium bulbiferum), the White Lily (L. candidum), and the Tiger Lily (L. tigrinum), all very handsome hardy herbaceous plants, but by no means so showy as many of their

congeners. The principal forms are described at some length under the Liliaceæ. All, or nearly all, are hardy in Britain, though some of them will scarcely attain perfection except in the warmer parts. A deep, well-drained, tolerably rich loamy soil suits them admirably, and the addition of good leaf-mould or peat, and sharp sand where a little stiff, is all that can be desired. A reference to the descriptive details at pp. 501–511 will give an idea of the many ways in which they may be employed to embellish the garden, either in the mixed border, or in special plantations devoted exclusively to the species of this genus.

The Crown Imperial is a noble plant in its different varieties, and will succeed best if treated generously, though it grows freely enough in ordinary garden soil.

c. Culture of Ranunculuses and Anemones.—Under this head we refer to Ranunculus Asiaticus and R. Africanus, and Anemone Coronaria and A. hortensis, the progenitors of the numerous florist's varieties in cultivation. The permanent rootstocks of these plants are composed of fascicled fleshy tubers, and they are here associated with the bulbous plants simply on account of their being capable of sustaining life for a considerable period out of the ground. Indeed, they will retain their vitality for one or even two years in a dry place, if protected from frost. The successful culture of these plants is attended with considerable difficulty, and this is especially the case with the double varieties. The single-flowered Anemones are, however, hardier, and require no more than ordinary attention. A few years back the choice double-flowered varieties of both Anemone and Ranunculus were extensively cultivated, but at the present time they are comparatively rare. This is probably the result of exaggerated notions regarding the difficulties attending their culture. These are by no means so great as is generally supposed, though doubtless they are sufficient to cause those with little time on their hands to shrink from encountering them. One thing is absolutely necessary to ensure good and abundant flowers, and that is annual lifting after the flowering season, when the leaves begin to die off. Otherwise they are apt to start again and flower in the autumn, rendering the chances of spring-flowering doubtful. A deep, free, well-drained soil, copiously manured with thoroughly rotten cow-dung, or from an old hot-bed, is also essential, with the addition of leaf-mould and sand, according to the nature of the ground in question.

Anemones prefer a somewhat lighter soil than Ranunculuses, but both will flourish where the above conditions are attainable. It is customary to grow them in beds or borders by themselves, and when these are artificially made, the best material to select is turfy loam that has been stacked and turned about until the herbage is decomposed. The inclination of the ground should be towards the south or east, and the situation tolerably open, that is to say, sheltered, but not shaded. Anemones for the principal flowering should be planted in September or October. If planted in spring they produce a far less luxuriant growth. The proper depth is about three inches, or rather less in a compact soil. The Turban Ranunculuses may also be planted in autumn, but the Persian, being rather tenderer, should be deferred till early spring. Ranunculuses prefer a cool, slightly retentive soil, but the drainage must be efficient. Watering is sometimes necessary, and should be carefully done. Protection from frost should be afforded, or the foliage and inflorescence will suffer. Another condition is firmness of the soil around the roots.

6. *Culture of Annuals and Biennials.*

Plants of annual or biennial duration possess so many valuable qualities that they are quite indispensable in the flower garden. Some are cherished for their fragrance, as the Sweet Pea, Mignonette, and Stocks; others for the showiness and the variety of their brilliantly coloured flowers, as Poppies, Zinnias, and Asters; others for their diminutive, compact habit, and profusion of flowers, as Leptosiphon and Ionopsidium; others for the duration of their scarious flower-heads, as Helichrysum and Waitzia; and others again for the elegance and grace of their inflorescence, as Humea elegans and Agrostis nebulosa. A large number of perennials, many of them tender, are commonly treated as annuals, and flower the first season. The fact of their being amenable to this mode of treatment is usually mentioned under the description. A notable case in point is the Lobelia Erinus, a difficult plant to preserve through the winter, but easily raised from seed, which it produces in great abundance. Annuals are of the greatest service for filling up vacant spaces, or, when judiciously selected, for growing by themselves in beds or borders. Such plants as the China Aster, Zinnia, and Phlox Drummondii, make very effective beds, either with their varieties mixed, or in separate colours. Another

recommendation to favour is the short period and little trouble required to raise many of them for succession, filling up or replacing failures. Annuals may be divided into three groups, namely, hardy, half-hardy, and tender. Although many of the tender species are either described or noticed in this work, they need not occupy our attention here; for all coming under this designation cannot be raised early enough to flower in the open air without artificial heat, and many of them are so delicate as to succumb to the least unfavourable changes of the weather, and at best their beauty is of short duration; still, with time and convenience for hot-beds, and warm, sheltered borders, with a light, permeable soil, they may be cultivated, if only for the sake of novelty. The strictly hardy annuals, or species treated as such, are of the first importance to the amateur of limited resources; and if they are not quite so numerous and brilliant as the half-hardy species, there is yet sufficient choice to admit of an effective display when associated with a small collection of perennials. If we include those species that merely require a little protection during cold nights, such as a hand-light, bell-glass, or inverted flower-pot, our list would contain nearly all those in general cultivation. Naturally these half-hardy species are better raised in a frame, either with or without a little artificial heat, because they may by these means be had in flower much earlier. Hardy annuals are those which may be sown in the open ground without any covering or protection whatever; amongst the most familiar we may enumerate—Candytuft, Sweet Pea, Lupins, Common Marigold, Larkspur, Nemophila, Clarkia, Saponaria Calabrica, Convolvulus tricolor, Mignonette, Love-lies-bleeding, Collinsia, Eschscholtzia Californica, and Collomia coccinea. These and numerous others may be sown in suitable weather at different times, from the end of February onwards, according to the requirements of the establishment. Where sown in patches in the mixed borders, the spaces should be thoroughly forked, and, if poor, a little leaf-mould and thoroughly rotten stable-dung from an old hot-bed, if attainable, should be incorporated with the native soil; the surface should be even and fine, and if dry and light, a little pressure will be beneficial after the seeds are sown. The latter should have a layer of mould over them about equal to their own volume. The seed of most annuals being very cheap is frequently the cause of their not attaining their normal development, for it is sown too thickly by ten times, and the surplus plants never rooted up. As a

rule, there are from half-a-dozen to a dozen plants where there is only space for one, and the consequence is mutual starvation. Watering should be carefully done with a fine rose when really necessary, but it is better not to water, especially on a stiff soil liable to cake, except during a prolonged drought. In the summer, when the plants are grown up, frequent waterings in dry weather will, however, prove beneficial. The removal of the seed-vessels will prolong the flowering season of many species, not only of this, but of all other classes.

Half-hardy annuals require raising in artificial heat, or where there is at least sufficient protection to exclude frost. They should be sown in March or April, and planted out at the same time as the bedding plants, about the middle of May. The same treatment may be adopted for these, as recommended under General Remarks for perennials, except that there is less necessity for a second frame or pit to remove them to according as they come up. Care should be taken not to remove them suddenly from a hot-bed to a cold pit. A very gentle heat is all that is required, and gradual hardening off is imperative before transferring them to their quarters in the open air. To obtain good strong plants the seedlings should be potted off when they are quite small, placing about three or four in a six-inch pot, and it should be borne in mind that a few vigorous plants will make a finer display than a great many weakly ones. The beds or borders should be renovated during the winter, and it is always better not to grow the same description of plants in the same places year after year. Asters, Zinnias, French and African Marigolds, Helichrysum bracteatum, Phlox Drummondii, ornamental Gourds, and most of the herbaceous climbers come under this head.

Biennials offer less variety, and only the hardy species are generally cultivated. Some, it is true, are treated as annuals, but the majority must be sown towards the end of summer, in order to flower the following spring. Brompton and Queen Stocks, Honesty, Hollyhock, and the Common Wallflower are familiar examples of the hardy members of this class. The Wallflowers are really perennial, but young plants flower more profusely than old ones. The double-flowered varieties of the Wallflower are propagated from cuttings, and the Hollyhock from offsets. Humea elegans is one of the most desirable of tender biennials. It may be treated as an annual if sown early in the year, but it neither grows so strong, nor flowers so freely as when raised during the preceding season.

7. *Culture of Tender Perennial Bedding Plants.*

A garden is scarcely considered furnished during the summer months without some Pelargoniums, Calceolarias, Verbenas, Heliotropes, Lobelias, Ageratums, Dahlias, and several other things. To raise and winter these plants a small greenhouse or warm pit is indispensable. Calceolarias are nearly hardy, and cuttings taken early in the autumn and bedded in thickly together will throw roots and merely require the protection of a frame during winter. Next in point of hardiness are the Pelargoniums: these likewise are propagated from cuttings in the autumn, either out of doors or several together in pans. They may be left in the beds or pans with ample protection from frost until the end of February or beginning of March, when they should be potted singly to enable them to form strong plants. The principal point to guard against during the winter, especially if they are stored where the temperature is low, is superabundant moisture. The beds or pans should be well drained, and water almost entirely withheld in severe weather. All dead leaves and decaying matter should be removed as soon as observed, or the young plants will be liable to damp off. Lobelias, as we have already mentioned, are raised by preference from seed, which should be sown early in the year. Verbenas, Heliotropes, etc., being rapid-growing plants, and rather tender, the simplest plan is to store a few old plants to obtain cuttings from in the spring. A little more heat should be applied about the beginning of March to stimulate the old plants into making new growth, and as soon as the shoots are two or three joints long, they may be taken off and put into the cutting pots, a hot-bed having been previously prepared for their reception. If healthy, and the hot-bed quite sweet, they will soon strike, when they should be potted off before the roots become matted together. A great deal depends upon their being kept free from parasitical vermin and mildew. Dahlia tubers should be stowed away in a moderately dry place where no frost can reach them. The beginning of March is the best time to start them into growth, the more gently the better. They are propagated by division of the tubers and from cuttings. Our concluding remark is, Do not turn out bedding plants too early, or without being properly hardened off.

CHAPTER II.

CLASSIFICATION OF PLANTS ACCORDING TO THEIR DURATION, HABIT, ETC.

For horticultural purposes, the Vegetable Kingdom may be divided into Woody and Herbaceous species. These terms are almost sufficiently expressive without explanation; but it is necessary to mention that all plants with annual stems, whether ligneous or otherwise, belong to the latter division. A few tender shrubs, Fuchsias for example, are treated as herbaceous, and cut down annually.

I. Woody Plants.

The following are the principal natural orders represented by the woody vegetation of this country, whether indigenous or introduced:—Berberidaceæ, Tiliaceæ, Rhamnaceæ, Sapindaceæ, Ilicineæ, Caprifoliaceæ, Cornaceæ, Ericaceæ, Ulmaceæ, Platanaceæ, Betulaceæ, Cupuliferæ, Salicineæ, and Coniferæ. A few species are contributed by the Magnoliaceæ, Cistineæ, Tamariscineæ, Simarubeæ, Celastrineæ, Hamamelideæ, Thymelaceæ, Elæagnaceæ, Lauraceæ, and Juglandaceæ. The orders here enumerated are composed almost exclusively of woody plants. The Rosaceæ, Leguminosæ, Oleaceæ, Saxifrageæ, and Araliaceæ include nearly all the remaining species. Woody plants are described as Arborescent or Frutescent.

1. Arborescent.—This division includes a vast number of subjects, varying almost indefinitely in minor details, such as size, habit, foliage, flowers, etc. Only those species which naturally form a single stem, instead of branching out at the base into a number of more or less equal ramifications, come under this head. These may again be divided into Evergreen trees, distinguished by their persistent foliage; and Deciduous trees, those which shed their foliage in autumn, or only retain it in a withered or discoloured condition through the winter. Some trees, it should be observed, which are evergreen in their

native countries, become deciduous when transferred to a colder climate, and the reverse is said to apply to some of our indigenous species when taken to a warmer climate. But the distinction is clear enough for all practical purposes. As generally understood, the term Evergreen is restricted to those plants whose foliage is persistent, and retains its natural hue during the whole of the year, or during several years. Or perhaps a better definition would be that the old leaves persist and retain their beauty until after the succeeding growth has furnished a fresh supply of fully developed foliage. Some of these, it is true, assume a different tint in winter, but the same leaves regain their freshness with the advent of spring.

a. Evergreen Trees.—With the exception of the Common Holly, Box, Portugal Laurel, Magnolia grandiflora, Evergreen Oak, Strawberry-tree, Sweet Bay, and a few others, this class is mainly furnished by one family, the Coniferæ.

Thus it will be seen that we are almost entirely dependent upon the deciduous class for trees bearing conspicuous flowers. Evergreen trees possess little that is attractive either in flower or fruit; but by way of compensation, the foliage of many species is very ornamental, and in habit they are unsurpassed for dignity and grace. We do not forget the bright scarlet berries of the Holly, and the handsome cones of some of the Firs and Cedars; but the former is oftener seen as a bush, and fruiting Conifers, with the exception of a few species, are still rare in this country. Although planters have now a very large number of species to select from, comparatively few of them have attained their full development with us, and therefore we are unable to judge of their value for permanent plantations. Many of them that are exceedingly beautiful when young, become unsightly as they rise above the dimensions of a shrub, and this, in many instances, may be ascribed either to uncongenial soil, defective planting, or exposure to bleak winds. The Yew, Cedar of Lebanon, Deodar Cedar, Norway Spruce Fir, Silver Fir, Mammoth Tree, Red Cedar, Austrian Pine, Pinaster, Pinus excelsa, P. insignis, P. Benthamiana, Picea, Pinsapo, P. Nordmanniana, P. nobilis, etc., Abies Douglasii, A. Canadensis, Araucaria imbricata, Cryptomeria Japonica, and several others, are known to be hardy. But several of these are impatient of a wet, heavy soil, whilst others will not flourish in an exposed situation. The question of suitability of soil and situation forms the subject of another paragraph.

Variegation in large evergreen trees—if we except the silvery bands on the leaves of many Conifers, which may be termed natural variegation—is almost unknown. There is, however, a variety of Cryptomeria Japonica beautifully variegated with yellow, a silvery variety of the Spruce Fir, and gold and silver varieties of Cupressus Lawsoniana ; and perhaps the most beautiful are the gold and silver variegated Yews ; but the latter are better referred to the shrubby class. Variegated Hollies 20 to 30 feet or more high are occasionally seen, but as a rule they do not exceed the dimensions of a shrub.

Weeping forms in the true sense of the word, as applied to the Weeping Ash, Elm, Beech, etc., are scarcely represented. Some, like a variety of the Silver Fir, have depressed branches. The varieties of Biota, Taxus, etc., with pendulous branches are more properly referred to the frutescent class.

b. Deciduous Trees.—In this class we have greater variety than in the preceding, both in habit and foliage, as well as flowers. We have trees of large and small dimensions, desirable in landscape gardening either for the beauty of their flowers or foliage, or for both combined. The number of large trees distinguished more for their foliage and grandeur of habit than for the attractiveness of their flowers, is very large, including the Oaks (Quercus Robur, Q. Cerris, Q. coccinea, etc.), Beeches, Elms, Sweet Chestnut, Planes (Platanus orientalis), some of the Willows (Salix fragilis and S. alba), many of the Maples (Acer platanoides, A. rubrum, A. Pseudoplatanus and A. eriocarpus), the Poplars (Populus tremula, P. alba, P. nigra, P. balsamifera, P. angulata, etc.), Hop Hornbeam, Planera Richardii, Common Birch, etc.—with simple, entire, toothed, or lobed leaves. Amongst large trees with pinnate leaves we have the Ailanthus glandulosa, Sophora Japonica, Common Walnut (Juglans regia), Black Walnut (J. nigra), the Hickories (Carya spp.), and the Ashes (Fraxinus spp.). Deciduous coniferous trees are not numerous; but there are three well-known species, representing as many distinct types, namely, the deciduous Cypress (Taxodium distichum), the Common Larch (Larix Europæa), and the Maidenhair tree (Salisburia adiantifolia). Amongst trees of smaller dimensions we may mention :—the Hornbeam, Common Alder, Sallow Willow, Liquidambar, some of the Maples (Acer Monspessulanum, A. Tataricum, A. polymorphum, and A. Pennsylvanicum), Paper Mulberry (Broussonetia papyrifera), etc.—with simple, entire, or lobed leaves ;

Stag's-horn Sumach (Rhus typhina), Negundo fraxinifolia Gleditschia spp., Pterocarya Caucasica, and Hop-tree (Ptelea trifoliata), etc.—with pinnate leaves.

A small number of deciduous trees are equally ornamental in flower and foliage. The most conspicuous example in this group is the Common Horse-Chestnut, to which we may add the Scarlet Horse-Chestnut, the Tulip-tree, the Lime, the False Acacia (Robinia Pseudacacia), the Cucumber-tree, (Magnolia acuminata), the Umbrella-tree (Magnolia tripetala), Catalpa bignonioides, and Paulownia imperialis, but the last seldom produces its flowers in perfection with us.

We now come to those trees planted almost exclusively for the colour they impart to the landscape, all of which are of comparatively small dimensions. To the first class belong the Laburnum in its numerous varieties, the Scarlet and Pink Thorns (Cratægus Oxyacantha vars.), the Almond, several species of Pyrus, as P. spectabilis and P. coronaria, and the Judas-tree (Cercis Siliquastrum). The following, though less ornamental, are worthy of a place in a large collection where greater variety is desirable: Cladrastis lutea, Æsculus Pavia in variety, Æ. Californica and Æ. glabra, Acer rubrum, Cerasus Avium, Cratægus Crus-galli splendens, and C. prunifolia, Halesia tetraptera, Caragana spp. on stems, Amelanchier vulgaris, etc.

The fruits of some trees are conspicuous in autumn and winter: such are the Mountain Ash (Pyrus Aucuparia), the Scarlet-fruited Thorn (Cratægus coccinea), some of the Crabs, as Pyrus melanocarpa, P. prunifolia, P. cerasifera, etc., Cotoneaster affinis, Rhus glabra var. coccinea, and Gleditschia triacanthos (very long thin twisted pods).

Deciduous Trees with variegated foliage.—Within the last few years, and especially during the last decade, a great increase has been made in the number of cultivated plants with variegated or coloured foliage, especially in hardy trees and shrubs. Whilst many of them are inferior in point of beauty to the normal green-leaved varieties, there are a few really effective and desirable, but they should always be sparingly planted.

1. *Trees having their foliage variegated with yellow and green.*—Sweet Chestnut (Castanea vesca foliis aureo-marginatis), Catalpa bignonioides aurea, Tulip-tree (Liriodendron tulipifera medio-picta), Common Beech (Fagus sylvatica aureo-variegatis), Elm (Ulmus campestris aurea), Sycamore (Acer Pseudo-platanus variegatus), Ash (Fraxinus excelsior aurea), and Elæagnus Japonicus aureo-marginatis.

2. *Trees having their foliage variegated with white and green.*—Turkey Oak (Quercus Cerris variegata), Beech (Fagus sylvatica foliis argenteo-variegatis), Elm (Ulmus campestris elegantissima), Elæagnus Japonicus albo-variegatus, Negundo fraxinifolia variegata.

3. *Trees with coloured foliage.*—The most striking of this limited group is the Purple Beech (Fagus sylvatica purpurea). The Copper Beech (F. s. cuprea) has dull reddish-brown leaves, and is not nearly so handsome. Another very handsome tree is the Scarlet Oak (Quercus coccinea), whose ample foliage changes to a brilliant scarlet hue towards autumn. Several other trees might be enumerated as worthy of consideration in planting, on account of the colour of their foliage. The Purple-leaved Sycamore, the Purple-leaved Elm, and the Abele (Populus alba), whose foliage is snowy white beneath, and Elæagnus argenteus, with silvery glistening scales, are examples.

4. *Trees with brightly coloured bark on the young branches.*—The Gold-barked Ash and the scarlet and yellow twigged varieties of the Lime are very distinct and beautiful, more especially the Scarlet-twigged Lime.

5. *Trees with cut or dissected foliage.*—There is scarcely a genus, or even a species, of cultivated trees that has not produced abnormal variations of foliage, from simple to deeply divided or cut. Some of these aberrations are very ornamental, whilst others can only be described as ugly monstrosities. Very handsome cut-leaved varieties of Beech, Alder, Elm, Lime, Horse-Chestnut, Sweet Chestnut, and Oak, are described or mentioned in the descriptive portion of this work. There are three or four species of trees which deserve special notice on account of the great number and diversity of the varieties they have produced, viz., Ulmus campestris, U. montana, Robinia Pseudacacia, and the elegant Japanese Acer polymorphum. The varieties of these trees may be counted by scores, or even hundreds in the case of the Robinia. A selection of the most distinct and ornamental is given under the respective genera.

6. *Weeping Trees.*—Under this head we include only those forms in which the main branches as well as the ultimate branchlets are pendulous. Until quite recently the Weeping Ash and Weeping Willow were the only trees of this class commonly seen. Now, however, the number in cultivation has increased from units to tens. But many of them, like the variegated and cut-leaved varieties, are mere degradations of

the parent forms. Amongst the more robust weeping trees with ample shady foliage, are the Purple and Green-leaved Beech, the variety pendula of Ulmus montana, and the Weeping Aspen (Populus tremula pendula). Sophora Japonica pendula is a very beautiful example of this peculiarity of habit. The Kilmarnock Weeping Willow (Salix Caprea pendula) is the ordinary broad-leaved form; and several others, as well as Weeping Ash-trees, will be found described in the first part of this work. More or less pendulous varieties of the Oak, Birch, Almond, Laburnum, Thorn, Poplar, and Mountain Ash are grown, but they do not possess the same title to the appellation as those above mentioned. Besides the foregoing, there is a host of weeping forms of smaller slender shrubby plants, such as the Privet, Broom, small forms of Elm, Prunus, etc. These are grafted or budded on stems of common varieties, and form very pretty objects planted out singly or interspersed with shrubs.

2. **Frutescent.**—The hardy species of woody plants coming under this denomination are even more numerous than in the first division, and offer greater variety in habit, foliage, and flowers. It should be borne in mind that many plants which never or seldom exceed the shrubby state in our climate become large trees in their native countries. And consequently the term shrub will be understood as of relative or comparative application, and as sometimes indicating the young state of a tree. For example, in sheltered or otherwise favourable localities, the following, amongst others, attain the dimensions of small trees: Rhododendrons, Sweet Bay, Arbutus, Portugal Laurels, Arbor-Vitæs, Hollies, Junipers, and Tree-Box. But as all of these in the ordinary way are shrubby, we include them here. Shrubs may be conveniently divided into two groups: Erect, and Climbing or Trailing. In each of these groups we may follow the same classification as that adopted for the trees. The term erect applies to all those shrubs that require no support to keep their branches off the ground. Thus we have:—

a. Evergreen erect Shrubs.—Firstly, we have shrubs with ornamental foliage and inconspicuous flowers; and here again the Conifers afford an extensive choice. The compact forms of many of the varieties of Thuja occidentalis, Biota orientalis, Taxus, Buxus, pigmy Pines and Firs, Junipers, Retinosporas, Ligustrum coriaceum, etc., are very interesting, and suitable for small gardens, single specimens on lawns, and the foreground

of shrubberies. A little larger in stature and adapted for second lines and clumps are the Phillyreas, Rhamnus Alaternus, Aucubas, the varieties of the Common Laurel, Juniperus Chinensis, J. communis varieties, Biota orientalis Japonica, B. o. glauca, B. o. pendula, Taxus baccata varieties, Hollies in variety, Buxus sempervirens varieties, etc.; and, in favourable localities, Euonymus Japonicus varieties, Photinia serrulata and arbutifolia, Pittosporum undulatum, Osmanthus, Japanese Hollies, tender Cypresses, Libocedrus Chiliensis, etc. In this class there are many species or varieties remarkable for their compact or formal habit. These are chiefly employed for planting in geometrical gardens as single specimens. They include the Golden Cypress, Irish Yew, Retinospora ericoides, Abies excelsa, pygmæa, and Clanbrasiliana, and many other dwarf forms of Biota, Thuja, and other Conifers, which are mentioned under their respective genera. Hollies, too, and Portugal Laurels, Sweet Bays, common Yews, and Phillyreas may be pruned into shape for the same purposes. Amongst the best of the variegated evergreen shrubs with inconspicuous flowers are: Aucubas, Hollies, Euonymus, and Box in variety, Yews, Arbor-Vitæs, Osmanthus, Thujopsis, and Retinospora. Evergreen shrubs of a larger size, some of which eventually become arborescent, are: Portugal Laurels, common Laurel, Sweet Bay, Arbutus, many Junipers, Cypresses, Arbor-Vitæs, common Yew, Evergreen Oak, Abies, and Picea.

We now come to the Erect Evergreen Flowering Shrubs. In this group, although we have considerable variety, there is little difficulty in making a choice. The greater part of them are known as American plants, and grow by preference in vegetable mould or peat. But some of them, as Rhododendron Ponticum, will flourish in a rich loam. Amongst the larger-growing species we have the Portugal and Common Laurels, Laurestine, Magnolia glauca, Rhododendron Ponticum, and gradually smaller species of Berberis, Rhododendron, Garrya, Gaultheria, Ceanothus, Andromeda, Ligustrum, Ledum, Kalmia, Daphne, and Erica. A selection of the best would include the following: Laurestine, Berberis Darwinii, B. stenophylla, B. aquifolia, B. Bealii, Magnolia glauca, varieties of Rhododendron Ponticum, Rh. Catawbiense, and Rh. maximum, Kalmia latifolia and K. glauca, Daphne Cneorum, Ledum palustre, Erica carnea, Yucca gloriosa, Ceanothus azureus and C. Veitchianus, and Andromeda and Gaultheria in variety.

b. Deciduous erect Shrubs.—Comparatively few of this class are grown for their foliage alone. Aralia spinosa, Rhus typhina, Elæagnus spp., Comptonia asplenifolia, Negundo fraxinifolia variegata, and some of the smaller forms of Maple, Elm, Beech, etc., are amongst the most familiar deciduous shrubs having ornamental foliage. In return, we have an almost bewildering richness in variety of deciduous flowering shrubs. It should be observed that many shrubs placed in this division are naturally evergreen in their native habitats, but our climate being more rigorous they usually shed their foliage in the course of the winter. Occasionally, when we have a mild winter, they retain their foliage till fresh is developed. This is the case with such tender plants as some of the species of Cistus, Cotoneaster Simmonsii, Hydrangea Hortensia, Ligustrum Japonicum, Spiræa Lindleyana, etc. The larger-growing deciduous flowering shrubs include the Lilacs, various shades of red, purple, and lilac and white; Hibiscus Syriacus, white or purple or striped double and single-flowered varieties; Thorns, white, pink, or scarlet double and single-flowered varieties (usually grafted on tall stems); Guelder Rose, white; shrubby forms of Æsculus, pink, yellow, or white; Rose Acacia, pink; Viburnum Lantana, white; Colutea arborescens, yellow; Calycanthus spp., purplish brown or red; Caragana spp., yellow (the dwarf species are commonly grown as standards grafted on stems of C. arborescens); Snowberry-tree, white; and Sambucus nigra varieties, white. Next in order come the Seringas (Philadelphus), white fragrant flowers; Ribes, red, yellow, and white; Cistus, white or rose spotted with purple or yellow; Leycesteria, dark purple and white; Genista, Spartium, Cytisus, yellow, white, and pink; Rhodotypus kerrioides, white; Spiræa, white, pink, or rose; Diervilla (Weigela), white, pink, rose, and crimson; Deutzia, white or pink; and Rubus, white or rose single and double-flowered. Azalea Pontica, A. Sinensis, A. calendulacea, A. nudiflora, etc., and their hybrid varieties, various shades and combinations of yellow, purple, pink, rose, and white; Rhodora Canadensis, purple; Rhododendron Dahuricum, purplish violet. A few species produce their flowers in winter or spring before the leaves are developed: Chimonanthus fragrans, yellowish green and red; Daphne Mezereum, purple, pink, or white; Forsythia viridissima and suspensa, yellow; Cornus mas, yellow; Prunus spp., rose and white. Many of the Fuchsias, Hydrangea Hortensia,

Melianthus major, and Pæonia Moutan, although of shrubby habit, will succeed when treated as herbaceous plants and cut down annually.

In the foregoing enumeration we have purposely omitted the Roses, because they deserve a short paragraph to themselves. It is not of the numerous garden hybrids that we wish to speak, for they are so universally known that it is unnecessary. We would rather call attention to some of the original wild forms and very hardy varieties that merit more favour than is commonly bestowed upon them, especially for planting in shrubberies and wild spots in the park. The history and detailed descriptions of the various wild forms will be found at pp. 148 to 171. Many of the old single and semi-double Roses, from the brilliancy of their flowers, are very ornamental and effective, and should be extensively planted amongst shrubs; and when grown as bushes on their own roots they require very little attention. Varieties of Rosa centifolia (Moss and Provence Roses), R. bracteata (Macartney Rose), R. spinosissima (Burnet or Scotch Rose); R. lutea (Eglantine or Persian Briar), R. ferox (Hedgehog Rose), R. rapa (Turnip Rose), and R. rubiginosa (Sweet Briar), are most suitable for the purposes indicated. Of course it will be understood that these are only recommended for large gardens, where there is abundance of space. For gardens of small size a selection of the best of the hybrid varieties would naturally be preferred.

c. Climbing, trailing, or twining Shrubs.—This division comprises plants of the most diverse habit and character. The evergreen element is furnished almost exclusively by the numerous green and variegated Ivies. For covering a north wall nothing equals the Ivy, and some of the handsome low-growing variegated varieties are worthy of a little space in more favoured aspects. A very valuable evergreen shrub for walls or banks is the Cotoneaster microphylla, whose scarlet berries and rich dark green foliage are very effective in winter; and with this we might associate Cratægus Pyracantha. Some of the Honeysuckles are nearly or quite evergreen. The best is Lonicera brachypoda, with its prettily variegated variety aureo-reticulata, though we should mention that this species succumbs to very severe frosts. Another, though rare, evergreen climber is Ercilla spicata, which will attach itself to a wall or tree in the same way as the Ivies. When we turn to the deciduous class, we meet with greater variety, and many species with very

brilliant flowers. For general purposes, where lightness and elegance are essential (for walls, trellis-work, festoons, bowers, etc.), the many species and varieties of the genus Clematis are amongst the most desirable. The large-flowered hybrid varieties of the Eastern species are exceedingly beautiful, but the fragrant C. Flammula, with small white flowers, should not be totally neglected in favour of its more showy relatives. C. montana, too, should not be omitted, on account of its early flowering season. The common White Jessamine (Jasminum officinale) should be mentioned in conjunction with Clematis Flammula. Wistaria Chinensis, with its long pendent racemes of blue flowers; and Tecoma radicans, with large panicles of orange-scarlet flowers, are two of the showiest of shrubby climbers, and suitable for covering large spaces on a south or south-western aspect. Several of the hardy Honeysuckles are esteemed for the agreeable fragrance of their less pretentious flowers. The varieties of the hardy Passion Flower (Passiflora cærulea) succeed well against a south wall, especially in the south and west in the vicinity of the sea. Cydonia Japonica, Jasminum nudiflorum, and some species of Lonicera, produce their flowers in winter or spring before the appearance of the leaves. Amongst Roses we have a great variety of climbing or trailing habit, and, in addition to these, many of the tenderer varieties of the Tea and other sections are commonly trained against a wall. The Climbing Roses belong to the groups Systylæ and Banksianæ, for particulars of which see pp. 167 to 171. We may mention here Bennet's Seedling, or Thoresbyana, as one of the most vigorous and free-flowering of this class. Lycium Barbarum, although not very showy, is a good climber for planting in confined places in towns. Periploca Græca, Wistaria brachybotrys, W. frutescens, and other species, Jasminum revolutum, Bignonia capreolata, Schizandra Chinensis, and Parechites Thunbergii, are less commonly grown deciduous flowering shrubby climbers, and for the greater part require slight protection in most parts of Britain.

A few deciduous shrubs of this class are included on account of their ornamental foliage. The one most widely known is Vitis quinquefolia, the Virginian Creeper. There are several other Vines in cultivation, but none that surpasses the foregoing. They include several North American and one Japanese species, besides some peculiar varieties of the common Grape Vine. Aristolochia Sipho and Menispermum Canadense

have large cordate leaves, and are very effective when associated with some of the more brilliant-flowered shrubs. The former is rather tender, and should only be planted in sheltered situations.

d. Shrubs requiring the protection of a wall or other shelter.—There are many beautiful and interesting shrubs, some of which are not included in either of the foregoing divisions, that may be successfully cultivated with a little additional care in winter. Many of them do not, it is true, require any covering, or even the protection afforded by a wall, in the milder parts of the kingdom, except during unusually severe weather. But as a rule they must be planted in warm well-drained soil, and, beyond the districts named, they will need the protection of a south wall, and in some cases extra covering in winter. Amongst the erect tender shrubs frequently met with we may enumerate: Euonymus Japonicus varieties, Photinia spp., Arbutus Andrachne, etc., Pittosporum spp., Myrtle, Elæagnus Japonicus varieties, Escallonia spp., Bupleurum fruticosum, and Osmanthus—with more or less ornamental foliage; and Hydrangea spp. and, varieties Magnolia grandiflora, Cornus (Benthamia) fragifera, Viburnum spp., Buddleya Lindleyana, and Spiræa Lindleyana—with conspicuous flowers or fruits. Tender shrubs requiring support as well as protection are equally numerous. The following are some of the more familiar species: Lonicera spp., Bignonia spp., Jasminum revolutum, etc., Fuchsia macrostema varieties, Berberidopsis corallina, Lapageria rosea, Philesia buxifolia, Stauntonia latifolia, Lardizabala biternata, Akebia quinata, etc. The foregoing list might be extended almost indefinitely, especially if made applicable to the colder parts of the kingdom. Further remarks relative to the hardiness of plants will be found under the head of General Observations. Amongst dwarf, trailing, or creeping shrubs suitable for covering banks, rockwork, etc., we may mention the genera Vinca, Helianthemum, Cotoneaster, Polygala, Rosa, Erica, and Clematis.

II. Herbaceous Plants.

In nearly all parts of the temperate zone of the northern hemisphere there is a great preponderance of the herbaceous over the woody vegetation, and we have scarcely any hardy

plants from the southern hemisphere. Hence it follows that we have a very much larger number of species to select from in this division than in the woody, and by judicious selection we may ensure a continuous display of flowers from early spring till the end of autumn, whilst a few cold-defying species serve to enliven the winter months. Several large orders consist almost exclusively of herbaceous plants. This will be seen on reference to the Ranunculaceæ, Papaveraceæ, Cruciferæ, Caryophylleæ, Malvaceæ, Compositæ, Campanulaceæ, Polemoniaceæ, Primulaceæ, Gentianeæ, Scrophularineæ, Convolvulaceæ, Labiatæ, Borragineæ, Liliaceæ, Irideæ, Amaryllideæ, etc. In addition to these, there are many other hardy species, representing at least fifty more natural orders. Herbaceous plants are either monocarpic or polycarpic (fruiting only once, or fruiting more than once). But the more familiar classification of herbs, according to their duration, is better suited for practical purposes. Perennial plants with few exceptions are polycarpic, and biennials and annuals are naturally monocarpic; some perennials, especially tender ones, that will flower the same season from seed, are treated as annuals; and some annual plants may be preserved in the absence of seed by propagating them from cuttings. But at best this is a very unsatisfactory procedure, except where the loss of a valuable species or variety depends upon the life of a single individual. In the following arrangement of herbaceous vegetation, we have preferred references to orders and genera in many instances instead of giving detailed lists of species, as it will be necessary to turn to the descriptive portion for information respecting height, colour, etc.

a. Perennial Herbs.—There is great diversity in the nature and habit, as well as in the uses of herbaceous plants. One of the principal distinctions, from a practical point of view, is the nature of the root or rootstock (or underground stem); it is fibrous, fleshy, tuberous, rhizomatous, or bulbous of some degree or modification. The only modifications generally distinguished by horticulturists are the extreme forms of the bulb, tuber and rhizome. Nearly all of the bulbous plants, whether with scaly bulbs as in the Lilies, or solid bulbs (corms) as in the Crocuses, belong to three or four of the Endogenous natural orders, such as the Liliaceæ, Melanthaceæ, Amaryllideæ, etc. We mention this fact here more particularly because it is necessary to pursue a different method of treatment for most plants of this class.

The first group of hardy perennial herbs demanding our attention is composed of what we may term florist's flowers, or those genera and species that have varied naturally or through artificial manipulation, and whose varieties are in almost universal cultivation. It is true that many of these are inferior in point of beauty to some species of more recent cultivation in gardens. And it is highly probable that many species of which we now possess only a single variety, may in a few years be represented by as numerous and variable a progeny as some of the older inhabitants of our gardens. What has recently been effected by intercrossing different species and varieties of Clematis may serve as an illustration of what might be done in this direction. The following genera include most of those garden plants belonging to the foregoing category. Anemone,[1] Ranunculus,[1] Pæonia, Aquilegia, Columbine, Delphinium (Larkspur), Dianthus, Pink, Carnation, Sweet William,[2] Viola, Heartsease, Violet, Althæa (Hollyhock),[2] Pyrethrum, Chrysanthemum, Campanula, Primula, (Polyanthus, Primrose, Oxlip), Phlox, Pentstemon, Antirrhinum, Mimulus; and Lilium, Hyacinthus, Tulipa, Crocus, Gladiolus, Fritillaria, Narcissus and Iris—with bulbous roots. Several tender herbaceous perennials are grown for the summer decoration of the flower garden; as Dahlia, Verbena, Petunia, Calceolaria, Lobelia, Veronica, Pelargonium, etc., for their flowers; and Coleus, Canna, Amaranthus, Mesembryanthemum, Perilla, Iresine, etc., for their foliage.

Herbaceous Plants with Ornamental Foliage.—The taste for plants coming under this designation may be said to be of comparatively recent origin, or at least we may affirm that it is only within the last few years that it has been developed and become general. This group includes tall-growing herbs with bold or graceful foliage, suitable for single specimens or clumps, or for planting at the back of mixed borders; herbs of intermediate size with variegated or otherwise ornamental foliage; and dwarf or trailing herbs with green or coloured foliage suitable for edging beds or borders or covering rockwork. Those hardy herbs of large stature desirable either for their noble habit or the amplitude or elegance of their foliage belong chiefly to the following families: Papaveraceæ, Halorageæ, Umbelliferæ, Compositæ, Polygonaceæ, Cannabinaceæ, Liliaceæ, Gramineæ,

[1] Tuberous-rooted.

[2] Usually treated as biennials.

and a few of the Filices or Ferns. Without entering into details, which will be found elsewhere, we may indicate a few of the best of those most readily procured: Bocconia cordata, Gunnera scabra, Heracleum flavescens, Ferula communis, Rheum undulatum, Polygonum cuspidatum, Bambusa falcata, Gynerium argenteum, Cannabis sativa, Asparagus officinalis, Aspidistra lurida, Phormium tenax, Osmunda regalis, Polystichum aculeatum, Pteris aquilina, Lastrea dilatata, L. Filix-mas and Athyrium Filix-fœmina. Several others might be included in this enumeration, but they find a place more properly with the marsh and water plants. Ricinus communis and Melianthus major are usually treated as herbaceous, the former as an annual and the latter as a perennial. The next group comprises plants of moderate size, and includes numerous species with variegated or coloured foliage, several of which are tender and only employed for summer decoration. But as almost all hardy genera and a vast number of species are represented by variegated varieties, it will be obvious that we must limit ourselves to a selection of those grown exclusively for their foliage. A few may be mentioned here with the foliage plants that are equally desirable for their flowers, such as Astilbe Japonica, Spiræa Filipendula, S. Aruncus, etc., Polemonium cæruleum, Amaranthus caudatus, and A. melancholicus, Pelargonium varieties, Morina longifolia, Canna species and varieties, Achillea spp., etc. Others, again—as Centaurea Ragusina and other species, Ligularia Kæmpferi, Cineraria maritima, Perilla Nankinensis, Iresine Herbstii, etc., Coleus (many varieties), Funkia, Brassica, Lamium maculatum, Phalaris arundinacea variegata, Mentha rotundifolia variegata, and Tricolor Pelargoniums—are grown for their variegated or coloured foliage. Amongst dwarf or trailing plants, the variegated or coloured varieties of Arabis albida, A. lucida, Gazania splendens, Bellis perennis, Trifolium repens, Alternanthera (various), Alyssum maritimum, Thymus vulgaris, etc., are some of the best for front rows or for edging. Cerastium tomentosum, Helichrysum petiolatum, and Stachys lanata, have greyish, or silvery velvety foliage. Another set of dwarf plants, belonging chiefly to the Crassulaceæ and Saxifragaceæ, are in request, on account of their formal habit, and the regular disposition of their variously tinted leaves in rosettes. With the foregoing, many tender herbs and shrubs with ornamental foliage are associated, including several species of Solanum,

Caladium, Begonia, Verbesina, Polymnia, Ficus, Wigandia, Ferdinanda, Musa, Vernonia, Nicotiana, Ricinus, Palmaceæ, Dracæna, Cordyline, etc., etc.

Herbaceous Climbing, Twining, or Creeping Plants.—Climbing herbs come under two denominations, distinguished by their duration, whether perennial or annual. The former have annual stems, but perennial rootstocks: for example, Lathyrus latifolius and L. grandiflorus (Everlasting Pea), Humulus Lupulus (Hop), Bryonia dioica and a few other Cucurbitaceæ, Tamus communis, Loasa aurantiaca, and Calystegia pubescens. With the annual climbers we include several tender species of perennial duration, which will flower the first season, and are consequently equally available for many purposes. Such are Cobæa scandens, Eccremocarpus scaber, Lophospermum scandens, Tropæolum aduncum (the Canary Creeper), Maurandya Barclayana, Phaseolus multiflorus or coccineus (Scarlet-runner Bean), and some Cucurbitaceæ. There are comparatively few climbing plants normally of annual duration in cultivation. The most familiar are Lathyrus odoratus (Sweet Pea), Pharbitis hispida (Larger Convolvulus), and Tropæolum major (Larger Nasturtium). In addition, there are numerous species and varieties of Cucurbitaceous plants with ornamental fruits. In sheltered situations they may be grown as trailers, but they are more effective trained against a south wall or trellis.

Herbaceous Plants of large stature, with Conspicuous Flowers.—The following list contains a number of large subjects suitable for back rows of borders, for intermixing with shrubs, or for planting in the wild garden. Nearly all of the species enumerated are either old garden plants, or such as are to be had from most growers of herbaceous plants. Many more might be added, belonging chiefly to the orders from which these have been selected:—Aquilegia vulgaris, etc., various colours; Aconitum Napellus varieties, blue and white; Delphinium hybrid varieties, blue and white; Pæonia species and varieties double and single, white, rose, scarlet, etc.; Papaver orientale, scarlet; Lychnis Chalcedonica, scarlet; Hibiscus roseus; Althæa rosea (Hollyhock), various colours; Kitaibelia vitifolia, white or rose; Galega officinalis, pink and white; Lupinus polyphyllus, blue and white; Spiræa spp., white, rose, red; Epilobium angustifolium, rosy red; Fuchsia (treated as herbaceous), scarlet; Œnothera spp., yellow;

Solidago spp., yellow; Centaurea Babylonica, yellow; Aster species, various colours; Chrysanthemum Sinense varieties, various colours; Dahlia variabilis varieties; Silphium laciniatum, yellow; Helianthus spp. (Sunflowers), yellow; Campanula species, blue and white; Verbascum species, yellow, white, or purple-brown; Digitalis purpurea, purple or white; Physostegia imbricata, lilac-purple; Salvia spp., various; Symphytum officinale, yellowish-white; Phlox, varieties of the perennial species, white, rose, pink, red, etc.; Phytolacca, purple berries; Aristolochia Clematitis, curious yellow flowers; Lilium candidum, white; L. giganteum, white; and other species with orange-yellow flowers spotted with black; Hemerocallis fulva and flava (Day-Lilies), Fritillaria imperialis (Crown Imperial), yellow, white, or red; Iris Germanica and I. Florentina, purple or blue and white; Veratrum album and V. nigrum, etc., etc.

Herbaceous Plants of medium and small size, with Showy Flowers.—It is neither necessary nor desirable to give detailed lists of plants belonging to this group, as a reference to the orders enumerated above will be sufficient to enable the amateur to select for himself. Under the head of florists' flowers, many of the principal genera and species are indicated, and these might be augmented by additional species from the same orders or genera. The majority of those species coming under the head of bulbous, aquatic, etc., belong in a measure to this group.

Herbaceous Plants with Bulbous, Tuberous, or Rhizomatous Roots, or Rootstocks.—This group includes many of the most brilliant occupants of our gardens; a large number of them flower, too, at a season when there is little else in bloom. Great use is now made of early-flowering bulbous plants to fill the beds and borders which later on are occupied by summer-bedding plants. Where this system is followed out, a fine display may be had by associating them with some other spring-flowering herbaceous plants. The nature of the rootstock admits of their being removed without much injury after the flowering season is over. Amongst the earliest of this class are Galanthus nivalis (Snowdrop), Crocus vernus, C. biflorus, C. Imperati, and C. versicolor varieties, Leucojum vernum (Spring Snowflake), Erythronium Dens-canis (Dog's-tooth Violet), Bulbocodium vernum, followed by Scilla spp. (Squill), Muscari spp., Narcissus spp. (Daffodil), Hyacinthus

orientalis varieties, especially the single ones, and early Tulips.

Besides the foregoing, there is a multitude of other bulbous-rooted plants, flowering from the spring onwards, till late in autumn. Sternbergia lutea, Colchicum autumnale, and several species of Crocus, are some of the later flowering kinds. The magnificent genera Lilium and Gladiolus are essentially summer-flowering plants. Lilium is distinguished from its allies by its scaly, not solid, bulbs,—a distinction to be remembered, as they suffer much more from exposure than do the solid bulbs, or corms, as they are technically termed. A few other genera commonly seen are Ornithogalum, Fritillaria (Crown Imperial), Iris Xiphium and Xiphioides. Crinum Capense, Eucomis punctata, Camassia esculenta, Pancratium maritimum, P. Illyricum, and Amaryllis Belladonna, are less frequently seen, but equally deserving of a place in a large garden. Most of the preceding have solid bulbous roots, but there are many allied genera with fascicled fleshy roots, or creeping rhizomes, as Anthericum, Funkia, Convallaria, Asphodelus, Hemerocallis, and the majority of the species of Iris. Another set of plants, whose roots are usually, in some cases, and invariably in others, stored away for a part of the year, includes the genera Dahlia, Canna, Ranunculus, Anemone, Oxalis, Tropæolum, Begonia, and Cyclamen. For further information respecting these plants and their allies, we refer our readers to the orders Liliaceæ, Amaryllidaceæ, Iridaceæ, and Melanthaceæ. Several other genera, chiefly from South Africa, and containing many very handsome species, will be found described in the first part of this work. Tigridia, Ixia, Sparaxis, Babiana, and Witsenia, include some of the showiest species, but they are all more or less tender.

Aquatic and Marsh Herbs.—Almost every garden of any pretensions has its watercourse or lake, either natural or artificial, or in lieu thereof some ornamental basins, tanks, or fountains. To fill these there is no lack of hardy subjects, suitable either for the small fountain-basin, or for the spacious lake or stream. For a small tank or basin we have such plants as Nymphæa pygmæa, Nuphar pumila, Calla palustris, Hydrocharis Morsus-ranæ, Utricularia vulgaris, Hippuris vulgaris (Horsetail), Limnanthemum nymphæoides, Stratiotes aloides (Water-Soldier), Aponogeton distachyus, and Alisma natans; to which might be added Lemna minor and other

species (Duckweed), and other indigenous water-weeds according to pleasure. For larger pieces of water, the White and Yellow Water Lilies (Nymphæa alba and Nuphar lutea) first claim our attention, followed by such plants as Sagittaria sagittifolia (Arrowhead), Alisma Plantago (Water Plantain), Butomus umbellatus (Flowering Rush), Pontederia cordata, Hottonia palustris (Water Violet), Limnanthemum nymphæoides, Ranunculus aquatilis varieties (floribundus, circinatus, etc.), Rumex hydrolapathum (Water Dock), Thalia dealbata, Typha latifolia, T. angustifolia, etc. There are also many plants that will grow either in shallow water, on the borders of rivulets or ponds, or in marshy ground; for example, Lythrum Salicaria (Purple Loosestrife), Caltha palustris (Marsh Marigold), Ranunculus Lingua (Spear-wort), Lysimachia vulgaris (Yellow Loosestrife), Spiræa Ulmaria (Meadow Sweet), Menyanthes trifoliata (Bog Bean), Equisetum Telmateia, syn. E. maximum (Large Horsetail), Carex riparia and other species, Scirpus lacustris (Bulrush), Cladium Mariscus (Common Sedge), Phragmites communis (Common Reed), Phalaris arundinacea, both green and variegated, Glyceria aquatica, G. fluitans, Osmunda regalis (Royal Fern), Acorus Calamus (Sweet Flag), Iris Pseudacorus (Yellow Flag), Sparganium spp. (Bur-Reed), Typha spp. (Reed-mace), Myosotis palustris (Forget-me-not), Polygonum amphibium, P. Bistorta (Snakeweed), and Potamogeton spp. (Pondweed). Some few marsh plants are of creeping or trailing, or dwarf habit, as Hypericum elodes, Lysimachia nummularia, Polygonum amphibium, Myosotis palustris, and Campanula hederacea, which prefers boggy places, as also Narthecium ossifragum (Bog Asphodel). By introducing a selection of the foregoing aquatic and marsh plants in suitable places in gardens and parks, much may be done to enhance the beauties of the water scenery. It is not supposed, of course, that many of those species enumerated would be admitted where the tastes of the owner lean to the artificial and trim style of horticulture. But as a rule, even in the wild and natural scenery of the park, nature is left entirely to herself. A few Water Lilies may perchance be favoured with a little attention, but beyond this very little is added to the indigenous vegetation, and very little is done to keep the various occupants within proper limits.

b. Annual or Biennial Herbs.—We include here several perennial plants, tender or otherwise, which will flower the first

season, and are consequently suited for the same purposes as those of essentially annual duration. Several orders are particularly rich in annual plants, just as certain regions favour an annual or perennial vegetation, according to climate.[1] The principal orders represented by annual plants, are the Ranunculaceæ, Papaveraceæ, Cruciferæ, Caryophyllaceæ, Malvaceæ, Geraniaceæ, Cucurbitaceæ, Compositæ, Polemoniaceæ, Convolvulaceæ, Scrophularineæ, and Amaranthaceæ. Many other orders are represented in gardens by annual species, and indeed by some of the most ornamental, such as the Portulacaceæ and the Campanulaceæ; but by far the greater number are referred to the orders above enumerated. For practical purposes annual herbs may be divided into several different classes, according to height, colour, degree of hardiness, etc. Climbing and trailing annuals are referred to at p. 613, where climbers with annual stems are reviewed. The most important division of plants belonging to this group depends upon their comparative hardiness. They may be roughly classed as hardy and half-hardy. The first will bear frost, more or less, and are usually sown in the open ground, where it is intended they shall bloom; and those belonging to the second class will not bear frost, and must be raised under glass, if desired that they should flower early and ripen seed.

The following is a selection of desirable hardy annuals:—Lychnis Cœli-rosa, rose or white, one to two feet high; Amaranthus caudatus (Love-lies-Bleeding), deep dark red, one to two feet high; A. speciosus (Prince's Feather); Centaurea moschata (Purple Sweet Sultan); C. odorata (Yellow Sultan), twelve to eighteen inches high; Anagallis indica, a trailer, with deep blue flowers; Bartonia aurea, yellow, one to two feet high; Centaurea Cyanus (Cornflower), various colours, two to three feet high; Chrysanthemum carinatum, varieties, about two feet high; Clarkia elegans and C. pulchella varieties, one to two feet high; Delphinium Ajacis and D. Consolida varieties (Larkspur), two feet high; Erysimum Peroffskianum, orange yellow, one to two feet high; Eschscholtzia Californica varieties, one foot high; Gilia, several species; Œnothera (Godetia), spp.; Helianthus annuus (Sunflower); Iberis umbellata, odorata, and amara (Candytuft), crimson, purple, and white; Lavatera trimestris, rosy-purple and white,

[1] For further observations on this point, see the paragraph on Geographical Botany in the Introduction.

three feet high; Leptosiphon species and varieties, various colours, about six inches high; Linum grandiflorum, rich red, two feet high; Lupinus affinis, luteus, etc., various colours; Malcolmia maritima (Virginian Stock), lilac-purple or white, one foot high; Nemophila various species, dwarf plants, with conspicuous flowers; Nigella damascena (Love-in-a-Mist), blue, one foot high; Papaver Rhœas and somniferum (Poppy), numerous varieties; Convolvulus tricolor varieties; Pharbitis hispida varieties; Reseda odorata (Mignonette); Saponaria Calabrica, rose or white, one foot high; Scabiosa atropurpurea, various colours, three feet high; Sphenogyne speciosa aurea, orange-yellow and black centre, very dwarf; Whitlavia grandiflora, violet or white, one foot high, etc.

The tender annuals in cultivation are equally as numerous as the hardy ones, and include many of the handsomer kinds, such as the numerous varieties of Callistephus hortensis (China Aster); Tagetes erecta (African Marigold); Tagetes patula (French Marigold); Zinnia elegans; Phlox Drummondii; Helichrysum bracteatum and apiculatum (Everlasting Flowers); Matthiola annua (Ten-week and Intermediate Stocks), and Impatiens Balsamina (Balsams), etc. To these we may add the less commonly grown Browallia elata, violet-blue, eighteen inches high; Calandrinia discolor, rosy pink, one foot high; Centaurea Americana, lilac-purple, three to four feet high; Cleome rosea, three feet high; Clintonia pulchella, blue and white trailer; many Curcurbitaceæ with ornamental fruits; Datura ceratocaula, white, three feet high; Gaillardia Drummondii, crimson and yellow, eighteen inches high; Grammanthes gentianoides, orange-red, three or four inches high; Helipterum species; Martynia fragrans, bright purple, twelve to eighteen inches high; Perilla Nankinensis, purple foliage; Portulaca grandiflora, varieties; Rhodanthe Manglesii and rosea, rosy-pink and yellow, about one foot high; Waitzia acuminata and corymbosa, pink or yellow, about one foot high. This and the preceding genus have everlasting flowers.

The following is a list of perennial and biennial herbs which will flower the first season. Some of them are perfectly hardy; whilst others, those with an asterisk prefixed, are tender, and of necessity treated as annuals: *Ammobium alatum, yellow and white, small-flowered, everlasting, from one to two feet high; Abronia arenaria, a trailing plant, with fragrant yellow flowers; *Anagallis linifolia, a trailing plant with blue flowers;

Calandrinia umbellata, crimson flowers, six inches high; Calliopsis Atkinsoniana (B.),[1] yellow, with dark centre, two to three feet high; Callirhoe involucrata, a trailing plant with crimson flowers; Campanula Carpathica, a dwarf species, with violet-blue or white flowers; Celsia Cretica (B.), yellow and brown, three to four feet high; Centranthus ruber, crimson or rose, two to three feet high; Eschscholtzia Californica (B.) varieties, orange-yellow, etc., twelve to eighteen inches high; Hedysarum coronarium (B.) (French Honeysuckle), red and white varieties, two to three feet high; Humea elegans (B.), a tender plant with graceful drooping grass-like inflorescence, four to six feet high; Linaria alpina, blue and orange, three or four inches high; *Lobelia Erinus varieties, dwarf, with blue and white flowers; Lychnis fulgens, bright red, one foot high; *Mirabilis Jalapa (Marvel of Peru), various, three feet high; Mimulus species and varieties; Œnothera acaulis, and taraxacifolia, dwarf plants, with large white flowers; Oxalis Valdiviensis, yellow, dwarf habit; *Reseda odorata (Mignonette); Scabiosa atropurpurea (Sweet Scabious) (B.), various, three feet high; Spergula pilifera, a pretty moss-like Caryophyllaceous plant; Statice, various; *Salpiglossis sinuata, various colours, twelve to eighteen inches high; *Tropæolum Lobbianum varieties; Verbascum Phœniceum varieties, three feet high; Viola cornuta varieties, blue; Viola tricolor (Pansy) varieties, etc.

[1] Those plants designated by the letter B. are of biennial duration.

CHAPTER III.

ORNAMENTAL GARDENING.

It does not come within our province, nor within the limits of this volume, to enter into details and directions respecting the laying-out and construction of a garden. To treat landscape and architectural gardening in an exhaustive and instructive manner would alone fill a much larger book than the present, and require a far more extensive knowledge of the subject than we pretend to possess. Nevertheless, there are many questions relating to the working arrangements of a garden, whether large or small, which it will not be out of place to refer to here. Alterations and would-be improvements of an original design are frequently undertaken by young gardeners without any fixed or preconceived idea of the object in view, or any notion of the cardinal principles to be observed in carrying out these operations. Too often features are introduced in this way, wholly regardless of their suitability to surrounding objects and conditions. A tree or a shrub, or a group of trees or shrubs, is planted, a conservatory or rustic summer-house is built, an aquarium, rockery, or terrace is formed, a geometrical parterre is devised, or a number of vases or groups of statuary are set up, and probably great pains and expense bestowed upon each separate work in order to produce an effective display; but all to little purpose, on account of the disregard of the fundamental principle that each detail of a garden should be subservient to and in harmony with a definite plan, forming a complete picture or series of pictures. Gardening is a veritable art, and one whose varied details are not mastered without much application, power of thought, and natural taste. It is an art, too, that may be as effectively practised in the cottage garden or villa plot, as in the princely domain of hundreds or thousands of acres in extent. The only difference should be in size and corresponding magnificence; none in regard to merit as a design appropriate to the situation.

One of the gravest faults committed by inexperienced gardeners is the confusion of styles by indiscriminate planting, and tasteless use of architectural adjuncts. A large and diversified area may admit of the development of all the known resources of horticulture, both in the picturesque and formal styles, including the various purely artificial accessories. But in all cases a lavish display of vases and other stone and rustic work should be avoided. It is much easier to err on the side of profuseness than on the side of sparseness of inanimate objects. We have seen this idea so much overdone as to give a small flower-garden the appearance of a manufacturer's show-yard. Where these accessories are admissible, or properly form a part of the plan, great discrimination and judgment should be exercised in the selection of elegant and suitable designs, harmonising as far as possible with the permanent buildings or other contiguous surroundings And, again, in the choice of a design for a pleasure-garden, whatever the size, due attention should be paid to the natural capabilities of the site, the style of the dwelling-house, and also to the character of the adjoining premises. In a broad sense, then, the plan should be projected for the ground, though to a certain extent, and in detail, the ground must be moulded in accordance with the plan. There is, of course, ample scope for individual taste, even when artistic rules are not ignored. And as every man is free to indulge his own particular fancies, more especially in all that appertains to his home pleasures, it would be idle to lay down hard and fast rules for his guidance. But there is a large class of men whose pursuits naturally prevent them from obtaining the necessary practical knowledge to enable them to select suitable shrubs and trees and decide upon the most attractive disposition of them, to produce a permanently effective garden. And often, too, it happens that they cannot afford to engage the services of a talented gardener. It is on behalf of amateurs, and what we may term the unprofessional gardeners, that the following and foregoing remarks are penned. The proprietors of extensive gardens and park-lands, as a rule, have competent men to direct their establishment, men of experience, who thoroughly understand their craft, and who could learn nothing from us. But it is so apparent to all observers that there is wide-spread want of correct taste, that a few words on this subject will not be superfluous.

Some men seem to forget to make the appendages of their abodes really tasteful, because they are satisfied with the natural attractions of the surrounding country; and as for many of those who call themselves gardeners, it is not too

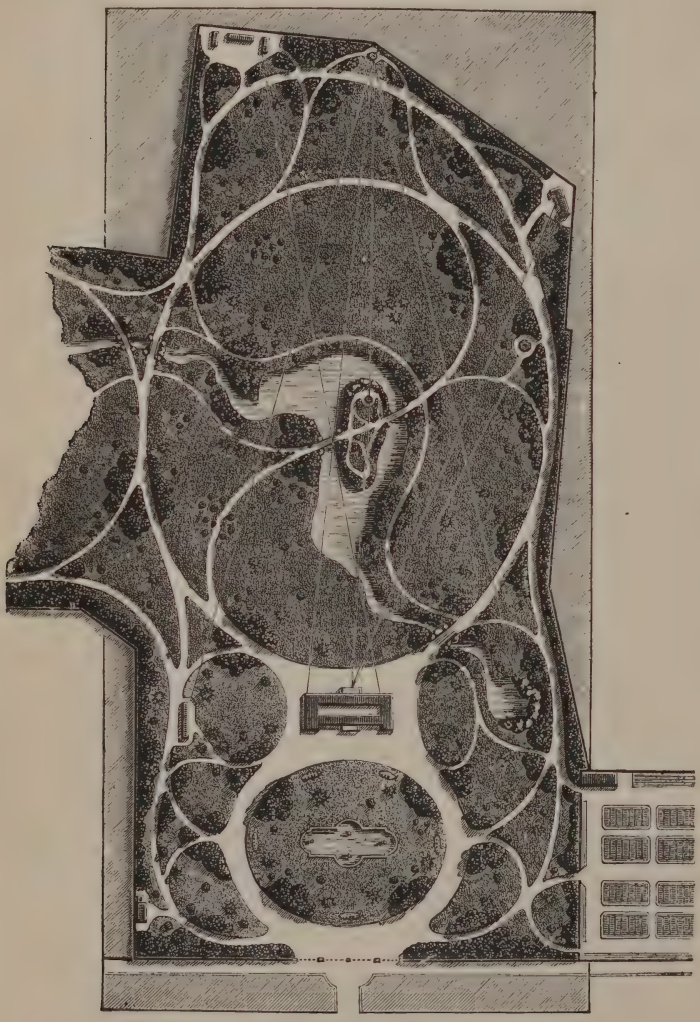


Fig. 262. PLAN OF MODERN FRENCH LANDSCAPE GARDEN.

much to say that they are utterly incapable of appreciating the beautiful. We shall not go into this subject to a wearying length, but rather confine ourselves to pointing out some of

the shortcomings of haphazard gardening, coupled with some indications for avoiding them. And here we may observe that the picturesque style of gardening is purely English, and that all countries have professedly copied or imitated the English style, as it is termed, with such modifications as the exigencies of the country rendered imperative. When we come to speak of the flower-garden and small garden plots, further allusion will be made to this subject. In a large establishment we often find a blending of the various styles in separate portions set apart for their illustration. The primary thing to be considered is the selection and arrangement of the subjects for the arborescent and shrubby plantations, where the garden is large enough to admit of such, and scarcely any garden is so small but that it will afford space for a few shrubs. The accompanying plan, fig. 262, was designed by the able French landscape gardener, M. Barillet Deschamps, formerly director of the plantations of the city of Paris, and is inserted here to illustrate the disposition of the trees and plantations, so as to secure the best views the situation and natural features of the estate and the surrounding country will afford. It is intended to represent a landscape garden of small size, comprising from five to ten acres of land. It should be observed, however, that the same rules would hold good for a much larger garden, and consequently the plan may serve as a guide on a more extended scale. But to return to the disposition of the plantations. It seems almost superfluous to say that the planting should be done so as to preserve permanently the most extensive and varied views, having at the same time an eye to necessary or desirable shelter for the residence, and to shut out all objectionable scenes, which will vary in nature according to the predilections of the owner. The lines on the plan, from the mansion to distant parts of the ground, will show what is meant by keeping the views open. It will be seen that the trees and shrubs are planted in detached groups at prominent points, nowhere intercepting the view, and leaving a clear space immediately around the house. And here we may remark that the planting of large-growing trees close to the house is, in our opinion, one of the greatest blemishes of modern villa-gardening. Pretty little residences are frequently completely shut in and darkened by large trees, and very often by one of the most objectionable of trees, namely, the Black Poplar. Trees close to a house may be all very well for a

month or two in summer, but for the remainder of the year they make the house gloomy and damp, choke the gutters with dead leaves, and give the whole place an uncomfortable appearance. If the garden is not large enough to have large trees at a distance from the house, dispense with them altogether, or be content with one or two, or at worst enjoy your neighbours'. There are scores of ornamental evergreen and deciduous shrubs to select from, and creepers against a wall do not keep a house so damp as overhanging trees.

The selection of the trees and shrubs would depend upon a variety of circumstances, such as soil and subsoil, or subjacent rock, elevation above the sea, distance from the sea, and, in the case of tender species the latitude, and more especially whether near the eastern or western side of the island. As it is not commonly the case to build a residence on an estate quite destitute of arborescent vegetation, some idea of what would flourish might be gathered from the condition of the species already in existence. On elevated ground exposed to bleak winds, it will be found necessary to plant, thickly at first, and in larger groups, with perhaps such trees as Populus nigra or Pinus Austriaca, for shelter. These trees are both valuable for this purpose, and the Poplar will grow and flourish in the stiffest clayey soil, where scarcely anything else would live. In fact, nearly all the species of Populus will do well in a poor soil, and bear exposure to the bleakest winds with impunity. Amongst our large forest trees the Oak and Beech are perhaps the most susceptible of the influence of the direct sea-breeze. The Elm will succeed well in a gravelly soil, especially in the vicinity of water. The Lime, Horse Chestnut, Sweet Chestnut, Plane, many Conifers, etc., will succeed in almost any ordinary soil. But for further particulars we must refer our readers to the review of arborescent and frutescent vegetation, pp. 599 to 609, and to the respective genera in the descriptive part of this work. Lists of species suitable for the sea-side and town planting will be found at the end of this volume. The plantations of trees and shrubs will vary in size according to the extent of the grounds, and may be composed of one species, or several different species, according to fancy. In forming a composite group the main object should be effective contrast of foliage, with an intermixture of flowering trees. Some deciduous species form a pleasing contrast between themselves; and the introduction of here and there a dark-leaved Conifer, or Purple Beech,

will greatly heighten the effect. The form of outline for such plantations may be varied to an almost unlimited extent, but a more or less irregular one is preferable, and a circular or any formal shape should be rarely adopted. Single specimens next engage our attention. For this purpose, good, healthy, well-formed examples should be chosen, as perfect habit is the principal end and aim of isolated trees. One important matter for consideration is the suitability of the species for the position selected, and then sufficient space for its natural development without infringing on the rights of its neighbours by overgrowing or shading them. In a garden of the limited area referred to above there will be comparatively little diversity of conditions and aspect; but whatever advantages it possesses should be made available for the use of more tender subjects. The information given under each species will be a sufficient guide as to what may be considered favourable conditions for different classes of plants.

The water capabilities of an estate should not be neglected. Either still or running water is almost indispensable, in fact, a landscape scene is hardly perfect without it. The rivulet or lake, or whatever form the water scenery presents, will suggest the nature of the adjacent plantations. It should be remembered that the water ought not to be concealed by over-planting, neither should the whole appear at one view. If practicable and large enough, an island bearing a proper proportion to the other part might be formed in the centre, and planted with suitable trees and shrubs. A few weeping Willows and other moisture-loving subjects, planted close to the water's edge, and overhanging it, will give a pleasing variety to the vegetation. The water itself, too, must support some of its natural productions, a list of which, with other information, will be found at p. 615. The same remark applies here as to the dry land. The whole surface of the water should not be covered, but only certain portions planted here and there, and the intervening spaces kept clear. The introduction and preservation of fish and water-birds is also a matter for consideration. And where of sufficient extent there should be facilities for boating. In setting out the roadways and footpaths, convenience as well as æsthetics will have to be consulted, at least for those leading from the house and other buildings to the more important points of egress from the park or garden, as the case may be. Straight roads and walks, and intersections at right angles, are too rigid

and abrupt to be tolerated, except in certain places, such as the kitchen-garden and the formal flower-garden. The walks should be so contrived as to lead through the most attractive parts in gentle curves, from shady glades to open eminences whence the view is uninterrupted, or only broken by some object that adds an additional charm to it. As much comfort and enjoyment depend upon the state of the walks, no pains or expense should be spared in their formation. A solid foundation in the first place will save much time and money in

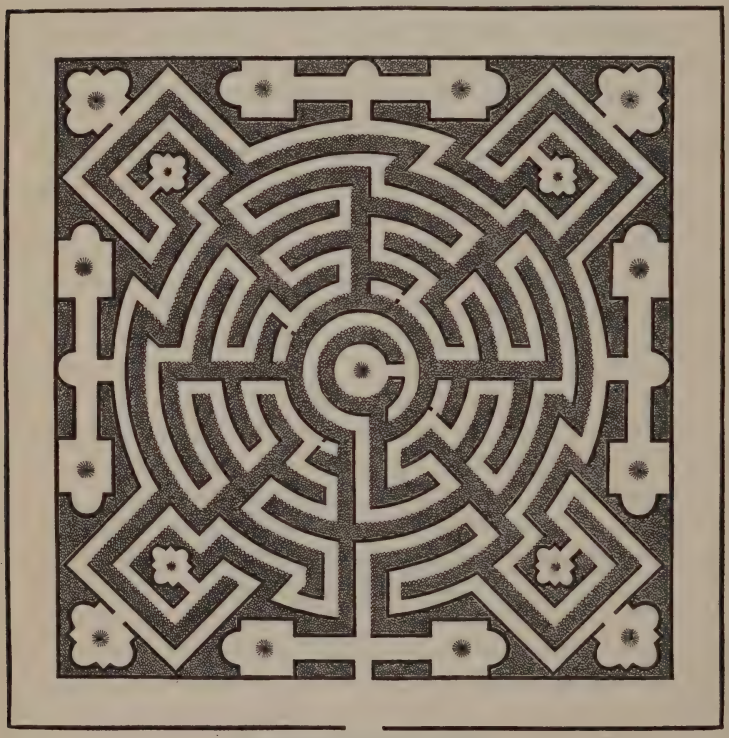


FIG. 263. PLAN OF A MAZE.

keeping a good surface, and attention to efficient drainage will prevent those in the lower parts from becoming water-channels. To a certain extent the width of the roadways and walks should be governed by the extent of space at command. Very narrow walks are inconvenient, and the cause of supplementary ones being trodden out on the turf on either side of them. But the approaches to a cavern or rustic summer-house, or other secluded spots may with propriety be narrow and tortuous.

We now come to consider the details or filling up of our picture, such as the shrubberies and flower-garden proper, with their various accessories. A fanciful method of planting, formerly more in vogue than at the present day, was a series of hedges and walks termed a maze or labyrinth, so arranged as to cause a considerable amount of walking to the uninitiated, in order to arrive at the centre. Fig. 263 is a representation of a maze, designed by Claude Mollet in 1653. The hedges may be composed of Yew, Hornbeam, Beech, Arbor-Vitæ, or espalier fruit-trees, according to taste, and the distance apart according to available space, but it should not be great. The height of the hedges would be regulated by the nature of the ground, whether flat or gradually rising towards the centre.

A rockery or artificial arrangement of stonework for the cultivation of Alpine plants is a thing not to be attempted by those who have not proper materials for constructing it, and ample time to devote to the care of its occupants. A rockery in perfection is one of the most expensive luxuries of gardening. A fair collection of Alpine and rock plants, it is true, may now be purchased for a comparatively trifling sum; but to keep them in health requires more than ordinary skill, combined with an intimate knowledge of their natural habitats and peculiarities of constitution. A tastefully constructed rockwork, in a suitable position, well clothed with the gems of the higher mountains and northern regions, is a continual feast for the lovers of nature's more modest yet curious productions, and therefore we cannot pass it over without a few words. The scale of such a construction would naturally be in proportion to the extent of the garden and the site chosen. It should be as simple as possible, and all embellishments in the way of ornamental stones or other accessories should be eschewed. In the choice of site we must be guided by the wants of the plants—plenty of air, facilities for supplying water in profusion, and freedom from the drip of trees—and also by the nature of the ground at our disposal. Porous rock and sandy peaty soil, so disposed as to leave interstices large enough for the bigger plants, and to afford shade to those requiring it, are indispensable conditions. Every portion must be well-drained, for, though they revel in moisture overhead at certain seasons, they are almost without exception very impatient of stagnant water at the roots. In building a rockery, the principal things to keep in view are proper pro-

portion, and simplicity and naturalness of design. Stones and pieces of rock belonging to different formations should not be indiscriminately mixed up together. But as there are special works on this branch of horticulture, necessary to those who undertake the cultivation of any except the hardier kinds of this class of plants, we forbear going into details, and for the same reason most of the rare species and those difficult to preserve have been omitted from the descriptive part of this work.

The principal feature of an English pleasure-garden is the lawn, for which the natural conditions of our climate are so favourable that with very little trouble we can have a perfect and luxuriant green turf all through the summer. The form of the lawn is determined by the outline of the area and by the course of the walks, so that no specific rules can be laid down as to the character of the plan most desirable for a place of given dimensions. Much would depend upon the nature of the ground, whether nearly level, or with any considerable fall from the house. Where the slope is very abrupt, the ground may be brought to two or three different levels, forming terraces; but a gentle incline is far more pleasing to the eye than a dead level of any extent, and unless there be sufficient fall for a terrace proportionate in height to the size of the place, it is better left alone. A drop of two or three feet in a place of large extent would not be sufficient to form an effective terrace, though for a more limited area it might be allowed. But even then it is folly to attempt to crowd the details of a large garden into a confined space. One of the most important details connected with the plantations around and approaches to the house, is to contrive them in such a way as to secure privacy for the flower-gardens, and to provide attractive scenes from the windows of the principal rooms. According to the extent there will be shrubberies and rosaries, mixed beds and borders, and the geometrical garden destined for the modern bedding-out system. And this would admit of the introduction of water-basins, fountains and vases, etc., in harmony, of course, with the residence. We need not say that the principal display, both in ornamental shrubs and flowering-plants generally, should be in the immediate vicinity of the house. For a pleasure-garden of small size, say from half an acre to two acres in extent, the old style of mixed beds and flowering and evergreen shrubs in clumps and single specimens, with a portion only of the beds reserved for massing,

is generally preferred. The beds should neither be overcrowded, nor too near together, nor fantastic in outline, and



FIG. 264. PLAN OF FLOWER-GARDEN OF ST.-GERMAIN-EN-LAYE.

the disposition of the belts and clumps of shrubs such as to present a pleasing view of some portion of the grounds, not

only as seen from the house, but also from different points of the garden. The parterre or flower-garden proper varies according to circumstances and resources, from a symmetrical arrangement of a dozen or twenty beds, to the most complex and elaborate designs; and it may consist, in part, at least, of a combination of beds and walks, or, what is more effective where the space between the beds is sufficient, an open design on the lawn. Fig. 264 is the plan of a flower-garden of the middle of the seventeenth century; but such elaborate plans are rarely carried out now, and, of course, are only suitable for a very large establishment, where the resources for stocking the flower-garden are almost unlimited. Some very simple arrangement of geometrical figures, or sections of figures, is that in general use at the present time, and these can be altered and modified to suit any outline.

While on this subject we may say a few words on the arrangement of colours, as on that alone depends the success of the system of massing flowering and foliage plants. Though not of so much importance in the mixed border, it should be one of the first considerations.

It is necessary to bear in mind that there are only three simple or primary colours, from which all the others are derived, namely, red, yellow, and blue; and that their complete fusion in certain determined proportions produces a sensation of white to the eye. These colours combined in pairs give birth to the composite colours. Orange, to wit, is the result of the union of red and yellow, green comes from the blending of yellow and blue, and violet is a combination of blue and red. The tint of these mixed colours varies according to the relative proportion of the two elements which enter into its composition; and as there is no limit to the variations of the proportions themselves, the result is an infinite number of intermediate shades between the two composing colours. A complementary colour is that which when added to a combination of colours, or a simple colour, will reconstitute the triad of elementary colours. Thus, green—composed of blue and yellow—is the complementary of red; violet—proceeding from red and blue—is the complementary of yellow; orange—composed of red and yellow—is the complementary of blue; and reciprocally, blue, yellow, and red are complementary to orange, violet, and green. The fusion of a colour with its complementary would naturally produce white. Black is merely the absence, or total extinction of the three elementary colours.

The association of these colours and their numerous shades in twos or threes, or in a greater number, produce a very different effect upon the eye, according to the combinations adopted. There are certain tints that mutually set off each other by approximation, and are pleasing to the eye; and there are others which lose by association, producing a very poor effect, and are even unpleasant and offensive to the eye. In the arrangement of colours we cannot choose a better guide than the eminent Professor Chevreuil, who has deeply studied the subject as applied to art, dyeing of fabrics, and the disposition of flowers in a parterre. We give the substance of the essential parts of his instructions.

1. The three simple colours, blue, red, and yellow, when pure, or nearly pure, contrast agreeably together; but in close contiguity each of them absorbs, as it were, something of the shade which would result from a proper combination with the complementary colours of its neighbours. For instance, red by the side of yellow assumes a slight tinge of violet, which is the complementary of yellow, and the yellow a shade of green, which is the complementary of red.

2. The colours complementary to one another contrast advantageously. This is sufficiently evident by the approximation of yellow and violet—composed of red and blue; red and green—composed of yellow and blue; or blue and orange—composed of red and yellow.

3. The binary association of composite colours will also produce pleasing results, because in each group all three of the elementary colours will be found reunited. That the contrasts will be strong and effective may be judged by bringing together violet (red and blue), and orange (red and yellow), or the former with green (yellow and blue).

4. But the results are poor or bad when simple colours are associated with mixed colours into whose composition they enter, as in this case only two of the primary colours are represented. Hence red contrasts badly with orange—yellow and red, and with violet—red and blue; blue with violet—red and blue, or with green—blue and yellow. Yet if the simple colour form but a small proportion of the mixed colour with which it is associated, the contrast will be sufficiently strong to please the eye. Thus a lively blue produces a good effect by the side of a bright or yellowish green, and bright yellow by the side of a deep green—in which the blue element predominates. But these two cases, as will be seen, come

within the preceding rules, which show that, in a general sense, contrasts are agreeable in the same proportion as they are decided.

5. All colours, simple or compound, are brightened by the vicinity of white, and moreover, contrast with it in a most agreeable manner. White has the additional advantage of improving bad combinations, by being placed between the colours that do not look well together, as, for instance, between red and orange, red and violet, or violet and blue, etc. Hence, this colour, so freely lavished in nature, plays an important rôle in decorative culture.

6. With the exception of white, all colours are weakened by the neighbourhood of black, which deprives them to a certain extent of their brilliancy. Dull or deep tints suffer especially when associated with black—resulting, of course, from the feebleness of the contrasts. But as black, broadly speaking, does not exist in the Vegetable Kingdom,[1] such contrasts could not be effected, except between the plants and the soil, and then the latter is never truly black. In the absence of this colour it is replaced to a certain degree by the dull purple foliage of such plants as Perilla Nankinensis, or by the very deep purple-violet flowers of the Sweet Scabious, some Dahlias and Hollyhocks.

The combinations of colours in the flower-garden are commonly binary or ternary, rarely quaternary, unless the green of the foliage be considered as taking rank in these combinations.

The most commendable binary combinations are as follow, which we arrange in the order of their respective merits :—

a. All colours, simple and compound, with white, though the brighter and purer the colours the more pleasing the contrasts ; for example, bright or deep blue with white, rose or red with white, bright yellow with white, orange with white, green with white, and violet with white.

b. The simple colours together, or with their complementaries, such as red and yellow, red and blue, yellow and blue, yellow and violet, orange and blue, and green and red.

Ternary combinations are far less numerous, and in most cases white is an element ; often, indeed, it is repeated. The following examples will enable one to judge : White, red and green ; or white, red, white and green ;—blue, orange, blue

[1] The black spot on the flower of the Horse Bean (*Faba vulgaris*) is perhaps the only instance of pure black in flowers.

and white; or white, orange, white and blue;—white, yellow, violet and white; or white, yellow, white and violet;—yellow, red, white and yellow; white, red, blue and white; or, better, white, red, white and blue;—white, orange, green and white, or better still, by interposing white between the orange and green;—white, orange, white and violet; or, still more effective, white, orange, white and violet;—white, yellow, green and white;—white, yellow, blue and white; or the same combination with the yellow and blue, separated by the white.

These examples, which we might multiply indefinitely, will suffice to make the laws clear that should be observed in this sort of combinations. In cases where the absence of desirable colours renders it necessary to associate those which are not complementary, they may be advantageously separated by white. We may add that in mixed bedding, where the colours are generally some distance apart, the foregoing laws may be more or less relaxed.

Without entering into the arrangement of large plants with ornamental foliage, and the crowd of tender species now employed in some establishments to form what are termed the Sub-tropical and Picturesque gardens, we may indicate a few of the plants that are easily obtained, and usually grown for summer bedding purposes,[1] classified according to their colours. There is a vast number of varieties with flowers of innumerable shades and colours, of such genera as Pelargonium, Verbena, Dahlia, etc.; but for massing only those with distinct and decided colours are admissible.

a. (1.) *Plants with Red, Scarlet, Crimson, Cinnabar, etc., Flowers.* — Begonia fuchsioides, Cuphea eminens; Dahlia, many varieties, especially the dwarf and small-flowered ones; Pelargonium (Geranium) Tom Thumb, and many other varieties; Gladiolus, various; Lantana Camara varieties, Lobelia cardinalis varieties, Mimulus cardinalis varieties, Pentstemon various, Phlox Drummondii, Tropæolum (Nasturtium) various, Roses in variety (pegged down), Verbena varieties, and Zinnia. (2.) *Carmine, Violet and Purple Reds, Rose, Cerise, etc.*— China Asters, Balsams, Chrysanthemum roseum, Dahlias, Linum rubrum, Mimulus cardinalis, Pelargoniums, Pentstemons, Phlox, Roses, Senecio elegans, Candytuft, Verbenas, Tropæolum (Nasturtium).

[1] Further on will be found lists of hardy herbaceous perennials suitable for permanent beds, either in the mixed or massed style of planting.

b. (1.) *Plants with Yellow Flowers*: *Pale Orange, Canary, Lemon, etc.*—Antirrhinums, Calceolarias, Dahlias, Erysimum, Eschscholtzia Californica, Bartonia aurea, Gazania splendens, Helichrysum, Waitzia, Lasthenia glabrata, Lupins, Mimulus luteus, African Marigolds, and other varieties of Tagetes, Double Common Marigold, Tropæolum, Zinnia, etc.

(2.) *Deep Yellow.* — Dahlias, Diplacus aurantiacus, Erysimum Peroffskianum, Mimulus, Pansies, Viola lutea grandiflora, African and Common Marigolds, Zinnia, etc.

c. Plants with Blue Flowers. — Agapanthus umbellatus, Ageratum varieties, Campanula various, Centaurea Cyanus, Delphinium formosum, etc., Eryngium alpinum, Gilia capitata, Heliotrope, Linum, Lobelia, Lupins, Nepeta, Plumbago Capensis, China Asters, Salvia patens, Viola cornuta varieties, etc.

d. Plants with White Flowers.—Ageratum, Balsams, Candytuft, China Asters, Campanula (white varieties of various species), Cerastium tomentosum and Biebersteinii, Chrysanthemum roseum varieties, Dahlia, Pelargonium, Lupins, Phlox Drummondii, Roses, Spiræa Filipendula, Verbena, Zinnia, etc.

The foregoing lists might be trebled or quadrupled; but as allusion is made to these supplementary bedding-in plants in the Classification of Plants, this will be sufficient for the purpose intended.

We may add a small selection of bedding plants with coloured or variegated foliage. Those in which two or three colours are blended are well represented by the Zonal and Ivy-leaved Pelargoniums, and the varieties of Coleus Blumei, Veitchii, etc.

Foliage nearly White, or Variegated with White.—Alyssum maritimum, Arabis lucida, Centaurea Ragusina and candidissima, Cerastium tomentosum, etc., Senecio (Cineraria) maritimus, Phalaris arundinacea, Mentha rotundifolia, Polemonium cæruleum, Stachys lanata, etc.

Foliage Yellow, or Variegated with Yellow.—Pelargonium several varieties, Chrysanthemum Parthenium aureum, Golden Feather.

Foliage Dark Red, Brown, Purple, etc.—Alternanthera (very dwarf), Canna various, Coleus, Oxalis corniculata, Trifolium repens, Perilla Nankinensis, Amaranthus tricolor, Iresine Herbstii, etc.

The above enumeration provides only for the summer de-

coration of a parterre; but where the outlay is of secondary importance, it is usual to have two or even three sets of plants in the beds during the year, and where expense is an object we should recommend the mixed style. As soon as the weather renders it necessary to remove the summer plants, the beds may be made attractive for the late autumn and winter months by filling them up with miniature evergreen shrubs. It is preferable to have these previously established in pots, and then to plunge them into the beds with their pots. The shrubs best adapted for this purpose are those of slow growth, and those which will bear close pruning, and then with care in transplanting, the same plants would do for several seasons. There is a great choice in the Coniferæ, including some of the small forms of Biota orientalis, Thuja occidentalis, Cupressus Lawsoniana, C. Nutkaensis, Retinospora spp., Irish and other Yews, etc. Of miscellaneous subjects suitable for this purpose we may name: Cotoneaster microphylla, with berries; Laurustinus, flowering bushes; green and variegated Hollies, berry-bearing, if possible; Aucubas also; several varieties of Buxus, Portugal Laurel, Erica carnea, and various Ivies. These shrubs might remain through the winter and until the middle of May, when they would be replaced by the summer plants, or they might be removed about the end of February, to make way for spring flowers. It is abundantly clear, however, that this system could only be carried out where the resources are equal to furnishing a supply of spring flowering plants in pots, already so far advanced as to make some show when turned out. In the case of bulbous-rooted plants, it might be so managed that they could be planted between the shrubs at the proper time in autumn; and where Crocuses and Snowdrops are used, there would be ample space for a bordering of them outside of the shrubs.

The bulbous plants best adapted for massing are Tulips, Hyacinths, and Crocuses, of which there is great variety in colour, including good scarlet, yellow, blue, and pure white, with many rich composite colours, and also many handsome striped varieties in the two latter genera. Narcissus, Scilla, and some other genera furnish varieties better suited for mixed beds. The following are some of the miscellaneous hardy plants employed in spring bedding:—Arabis albida, Alyssum saxatile, A. Gemonense, Aubrietia Campbelli and other varieties, Anemone hortensis and A. Coronaria in variety, Phlox

subulata varieties, Doronicum Caucasicum, Helleborus orientalis, Anemone Hepatica varieties, Myosotis alpestris, Polyanthuses, Primroses, Wallflowers, Sweet Violets, etc., etc.

In the preceding pages we have hastily sketched the principal features of a pleasure-garden, and pointed out some of the commoner defects in planting and arrangement; but as most of our remarks apply to a garden of two or three acres, or more, in extent, and as gardens of still more limited dimensions are those usually worst arranged and managed, we purpose going a little more into details respecting the planting and choice of plants suitable for small gardens and garden plots. This we shall do with special reference to modern villa gardens, in the country and on the outskirts of towns. These vary from a small plot in front of the house, consisting of a few poles in area to two or three or more roods, surrounding the house. Frequently the nature of the soil is the principal difficulty in the way of establishing a flourishing and ornamental garden. A stiff clay, especially, is a very disheartening soil to encounter, and perhaps one of the commonest the occupier of a new house meets with, as land of an inferior description in country places is that first sold for building upon. Another drawback is the impossibility in many places of finding an outlet for underdrainage, which, where practicable, is one of the first operations towards improving the condition of the ground. In the case of a person purchasing a plot and building his own house, many of these untoward circumstances may be avoided or controlled. Arrangements can be made for effective drainage, and if the alluvial soil be thin and poor, the most can be made of what there is. For instance, the mould should be removed from the spot to be built upon, as well as the roadway and walks, and transferred to such parts it is intended to cultivate, that are most in need of enrichment. Where a plot is covered with turf, this should be taken off and stacked up with some good farm-yard manure. When partially rotten, it would require turning over, and by the time the house was built it would be ready for use. That portion of the garden, if any, intended for a lawn, would naturally retain its turf, if level and good; but otherwise it would be better to procure fresh turf, or prepare the soil and sow it with a selection of grasses. Where the soil is very heavy and stiff, it is much more economical to procure some better, to plant trees and shrubs in,

and to make up the flower-beds, than to try to make anything grow in it without mending, for the loss of plants by death, to say nothing of the loss of time, would soon exceed the cost of a few tons of mould.

The principal and first thing for consideration is the general plan of the garden. Of course this would depend upon a number of circumstances, such as size, position of the front of the house with regard to the public road, whether it is to be a detached or semi-detached house, or one of a block of houses with means of exit on both sides, etc. As a rule, the south or west aspect is preferred for the front of a house, and consequently the flower garden or the principal part of it would be between the house and the main road, or the back of the house towards the road. We will take a detached house standing in grounds about half an acre in extent, and facing south or west, as the case may be, towards the main road. A portion of the ground at the back of the house is usually set apart for growing a little fruit and a few vegetables, and the remainder, with that in front and at the sides, is devoted to flowers and shrubs. There will be sufficient space for a carriage-road in to the front door on one side, and a secluded pathway to the back door on the other, and a conservatory might be erected against the south or west end of the house. But all these are details that cannot be fixed for any one to act upon, as the local circumstances, surrounding premises, and tastes of owners, are as different as the number of places. The main thing is to make the most of the site by properly planning out the ground, and deciding upon a design before starting, and then in selecting suitable plants to fill it. Shrubs with woolly or clammy leaves should be avoided for planting near a dusty road, and those, whether evergreen or deciduous, with smooth shining leaves preferred, as they are much more readily cleansed by a shower of rain. In a garden the size we have imagined, there would be room for a belt of shrubs, faced with mixed borders, around the circumference of the front garden, enclosing a lawn with a few small beds, and a central shrub, or vase or fountain and small basin, and a path past the conservatory, or west (or south) end of the house, to the back garden.

The planting of shrubs and small slow-growing ornamental trees would depend upon the object in view, whether to make the garden as secluded as possible, and shut out overlooking neighbours, or to keep open some pleasant prospect. But

under no circumstances should large fast-growing trees be planted, as they soon kill or starve everything else. Two or three good trees in such a garden would be quite enough, for the rest evergreen and flowering deciduous shrubs would suffice. Tender subjects should be avoided altogether, as blanks caused by frosts would be too conspicuous. Even the Common Laurel might well be dispensed with, especially in heavy soils, for there is the risk of its being cut down to the ground every fifth or sixth year; and the Portugal Laurel is equally effective as an evergreen and much hardier.

As a guide in choosing plants for a small garden we here append short lists[1] of perfectly hardy subjects. It will be understood that these lists do not include a quarter of the available species, but only a few of the best and those most extensively grown. We have already warned planters against the use of large or fast-growing trees in small gardens, for however pretty they may be for a few years, they will eventually outgrow the place, obstruct the view, and spoil all undershrubs and plants. A few small trees may be sparingly planted, especially some of the coniferous shrubby trees that will bear pruning with impunity, for example, Cupressus Lawsoniana and C. Nutkaensis, Cedrus Deodara, Pinus Cembra and P. muricata, Libocedrus decurrens, Thuja gigantea (Lobbii), and English Yew, amongst evergreens; and Laburnum, Almond, Judas Tree, Scarlet and Pink Thorns, Æsculus Pavia, Elæagnus angustifolius, Liquidambar styraciflua, and Catalpa syringæfolia—small trees with deciduous foliage and, for the greater part, with handsome flowers. The most desirable shrubs for a small garden are those which are permanently ornamental, that is to say, evergreens either with or without conspicuous flowers. Deciduous flowering shrubs should be used for filling up, and where neither screen nor shelter is needed in the winter. For hedges and screens, Portugal Laurel, Arbor Vitæ (Thuja occidentalis), and English Yew are as good as anything. Holly is very handsome, but of much too slow growth for general purposes. The following are some of the best evergreen shrubs:—

1. *With conspicuous Flowers.*—Berberis Darwinii, orange; B. aquifolia, yellow; Laurustinus, white; varieties of Rhododendron Ponticum, maximum, and Catawbiense, various; Magnolia glauca, creamy white, etc.

[1] A few pages forward some remarks will be found on shrubs, etc., suitable for sea-side planting.

2. *Destitute of conspicuous Flowers, but having ornamental Foliage, and often showy Fruits.*—Hollies, variegated and green; Aucubas, variegated and green; Tree Box, several varieties; Phillyrea spp., Irish Yew, Juniperus Chinensis, Biota orientalis aurea (Golden Cypress), and other varieties, dwarf varieties of Thuja occidentalis (American Arbor Vitæ), Retinospora spp., Cupressus Lawsoniana minima, and many other coniferous shrubs. Kalmia latifolia, Rhododendron hirsutum, Erica carnea, and Daphne Cneorum are dwarf flowering evergreen shrubs; the two latter are less than a foot high, and produce their flowers in winter and spring respectively.

In deciduous shrubs we confine ourselves to those with showy or fragrant flowers:—Lilacs various, including the Persian; Philadelphus coronarius and grandiflorus (Mock Orange, Seringat), white; Pyrus Japonica, scarlet, rose, or white; Guelder Rose, white; Buddlea globosa, orange; Genista alba, white or pink; Spartium junceum, yellow; Ribes aureum, yellow; Ribes sanguineum, deep red; Azalea Pontica, great variety of colours; Diervilla rosea and amabilis, rosy-purple; Magnolia purpurea, rosy-purple and white; Deutzia crenata, white; and several species of Spiræa with pink or deep rose-coloured flowers. We have not referred to the Roses in the list, but they are so universally known that nobody would forget to plant them as dwarf bushes on their own roots, as standards on the common Briar, and the climbing varieties for festoons and covering walls.

We conclude our lists of shrubby plants with a few climbers, or such species as are suited for walls, trellises, archways, etc. Foremost amongst the deciduous class are various species and varieties of the genus Clematis. C. Flammula and C. montana are two of the hardiest of the small white-flowered species. The coloured varieties are very numerous, and every year adds to them. The White Jasmine, Passion-flower, Common Honeysuckle, Jasminum nudiflorum, Virginia Creeper, Pyrus Japonica, Wistaria Sinensis, and Climbing Roses make up a list sufficient for all purposes. The best of the evergreen class of shrubs for walls are Cotoneaster microphylla, Cratægus Pyracantha, and various Ivies.

It is an easy transition from these to the herbaceous climbers. We give a list of a few of the annual species, or those treated as such, all of which like a warm aspect (a more extensive list will be found a few pages forward): Tropæolum aduncum

(Canary Creeper), Pharbitis hispida (Larger Convolvulus), Lathyrus odoratus (Sweet Pea) in variety, Cobæa scandens, and Tropæolum majus (Nasturtium).

A small selection of hardy perennials, limited to those of good constitution, and little exacting as to the quality of the soil, may be useful. It includes a few for each season, with general indications as to colour.

Plants flowering in Winter.—Galanthus nivalis (Snowdrop), white; Helleborus niger (Christmas Rose), white or pink; Eranthis hyemalis (Winter Aconite), yellow; and Scilla Sibirica (Siberian Squill), blue.

Plants flowering in Spring.—Crocus vernus and C. versicolor, white, blue and yellow, and striped varieties; Tulipa, Narcissus, and Hyacinthus in variety; Scilla verna, blue; Muscari racemosum and M. botryoides, blue or white; Saxifraga crassifolia, etc., purple; Arabis albida, pure white; Alyssum saxatile, yellow; Anemone Hepatica, blue, pink, and white varieties; Orobus vernus, lilac and blue; Polyanthus and Double Primroses, various; Viola odorata, varieties; Adonis vernalis, yellow; Cheiranthus Cheirii (Wallflower), in variety; Dielytra spectabilis, rosy-pink; Pæonia officinalis and albiflora, crimson, rose, or white, double or single-flowered varieties; Aubrietia deltoidea, varieties, shades of blue and purple; Phlox subulata, purple, pink, or white; Anemone Coronaria, etc., varieties of many colours; Convallaria majalis (Lily of the Valley); Iberis sempervirens, white; Vinca major and minor, blue and white, and varieties with variegated foliage, etc.

Plants flowering in Summer.—The number of species in cultivation which produce their flowers in summer is, of course, much larger than that of all the other three seasons put together; hence the following selection is relatively more limited than the foregoing:—Campanula persicifolia, C. latifolia, C. rotundifolia, and other species, blue, white, and pink; Centranthus ruber, crimson, red, and white varieties; Geranium sanguineum, deep red; G. pratense, etc., blue; Gladiolus communis, violet-purple, red, or white; Gladiolus Gandavensis, etc., numerous brilliantly-coloured varieties; Phlox paniculata and maculata in variety; Althæa rosea[1] (Hollyhock), great variety; Lamium maculatum, variegated foliage; Lilium candidum, white; L. Chalcedonicum, L. Martagon, L. tigrinum, etc., orange, white, etc., spotted with purple brown; Lychnis Chal-

[1] Usually treated as a biennial.

cedonica, bright scarlet; Antirrhinum, various colours; Pentstemon, various colours; Papaver orientale, scarlet or orange-scarlet; Lupinus polyphyllus, blue and white; Delphinum formosum, etc. (Larkspur), blue and white; Aconitum Napellus (Monkshood), blue and white; Polemonium cæruleum, blue or white; Ranunculus aconitifolius (Fair Maids of France), double white-flowered variety; R. acris (Yellow Bachelor's Buttons), double yellow-flowered variety; Veronica spicata, blue and white varieties; V. gentianoides, pale blue; Spiræa Filipendula, double white variety; Achillea Ptarmica, double white variety; Aquilegia vulgaris, etc., numerous brilliantly-coloured varieties; Eryngium alpinum, blue stems and inflorescence; Epilobium angustifolium, rosy-purple and white varieties; Iris Germanica, Susiana, etc., various colours; Myosotis sylvatica, blue; Hemerocallis flava and H. fulva, yellow and tawny; Potentilla atrosanguinea and P. Nepalensis, varieties, yellow to dark crimson; Geum Chiloense, scarlet and crimson varieties; Solidago Virgaurea (Golden Rod), yellow; Aster, various species, blue, purple, or white; Anemone Japonica, rosy-purple and other varieties; Tradescantia Virginica, blue, white, and reddish-purple varieties, etc.

Plants flowering in Autumn.—The number of species peculiarly autumnal in their flowering is very small; but in favourable seasons a great many of the late summer plants continue to bloom till the end of autumn, or even until Christmas. Chrysanthemum Sinense, various species of Aster, Sternbergia lutea, and some rare species of Crocus may be mentioned.

To make this series of lists complete, we include a selection of some of the hardiest and most desirable annuals, or plants commonly treated as such. Those species preceded by an asterisk are tender, and must be raised in a frame or greenhouse to get them early in flower:—Amaranthus caudatus (Love-lies-bleeding), crimson; A. hypochondriacus (Prince's Feather), crimson; Centaurea moschata (Purple Sweet Sultan); Calendula officinalis (Common Marigold), orange-yellow double-flowered variety; *Callistephus hortensis, great variety of colours; Centaurea Cyanus, blue, white, and pink varieties; Clarkia elegans and pulchella, pink, lilac, purple, and white varieties; Collinsia bicolor, lilac, and white; Delphinium Ajacis and Consolida (Rocket and Branching Larkspurs), various

colours; Dianthus [1] barbatus (Sweet William), various; Eschscholtzia Californica, orange and other varieties; *Helichrysum bracteatum (Everlasting Flowers), white, yellow, pink, red, and other varieties; Iberis umbellata (Candytuft), white, lilac, and crimson varieties; Lavatera trimestris, rosy-pink or white; Leptosiphon Androsaceus, etc., various colours; Linum grandiflorum rubrum, deep carmine; Lupinus luteus, albus, etc., various colours; Malcolmia maritima (Virginian Stock), lilac-purple and white varieties; Nemophila insignis, etc., varieties; Papaver Rhœas (Poppy), Ranunculus-flowered varieties of many colours; * Phlox Drummondii, various; Reseda odorata (Mignonette), Saponaria Calabrica, rose and white varieties; Scabiosa [1] atropurpurea (Sweet Scabious), various colours; Schizanthus pinnatus, several varieties; Silene pendula, rosy-purple and white varieties; Tagetes erecta (African Marigold), orange and sulphur-yellow varieties; Tagetes patula (French Marigold), many varieties; Tagetes signata pumila, yellow and purple-brown; Whitlavia grandiflora, violet-blue and white varieties; *Zinnia elegans, various colours, etc.

We conclude this subject with a short list of Ferns, all of which are indigenous and easily grown:—Lomaria spicant, Asplenium Filix-fœmina, Nephrodium Filix-mas and spinulosum, and Aspidium aculeatum in variety, will flourish in almost any ordinary garden soil in half-shaded places. Asplenium Trichomanes, A. Adiantum-nigrum, Scolopendrium vulgare, and Polypodium vulgare, require attention in drainage. And finally, Osmunda regalis delights in marshy ground.

PLANTS FOR THE SEA-COAST.

Sea-side planting presents many difficulties, especially on a bleak exposed shore, where comparatively few things will flourish. Still there is no necessity for the monotonous repetitions of Poplars, Tamarisks, and the few other plants ordinarily met with at watering-places, which, as a rule, are in sheltered situations. In such localities there is scarcely any limit to the number of species that may be successfully cultivated. It would be superfluous to enumerate all the species that might be grown; but a glance at some of the more suitable subjects will serve as a guide to what may be effected. Of course the

[1] Biennial.

same species are not available for all parts of the coast, though strictly hardy plants, capable of withstanding the wind, will do equally well, other things being equal, on any part of the coast. Probably the south-west winds are more injurious to trees and shrubs than the eastern or north-eastern, and, therefore, all those species which will bear the greater cold of the eastern side of the island with impunity will thrive as well, or nearly so, as on the western. In tolerably sheltered situations near the sea in the south-western and western parts of Great Britain and Ireland, the otherwise tender Japanese, North American, and South European plants will flourish; and we might add a few from the southern hemisphere, from New Zealand and from the extreme south of America. A large proportion of these species will do well in the immediate neighbourhood of the sea. The following enumeration includes some of the best, the greater part being evergreen shrubs:—Euonymus Japonicus varieties, Phillyrea varieties, Cupressus macrocarpa, Aucuba Japonica varieties, Escallonia macrantha, Hydrangea Hortensia varieties, Cistus (various species), Genista alba, Spartium junceum, Cytisus species, Berberis Darwinii and other species, Baccharis halimifolia, Laurus nobilis, Rhamnus Alaternus, Ephedra species, Viburnum Tinus, Ligustrum (various), Buddlea globosa, Spiræa, Ribes, and Ceanothus (various), Coronilla Emerus, Yucca species, etc.

There is scarcely any spot where the soil is deep enough for cultivation, but what may be improved by planting some of the very hardiest trees or shrubs to protect the flower-garden and the tenderer shrubs. The shelter afforded by trees or shrubs is far more effective than a solid wall, on account of the back wind, as it is termed, from the latter, which is often more destructive than the direct wind. Pinus Austriaca, P. maritima, and some of the other species of dense habit, English Yew, Holly, Evergreen Oak, Double-flowered Furze, Black Poplar, Sycamore, Small-leaved Elm, Tamarisk, Tree Box, and Sea Buckthorn, are some of the hardy subjects that will bear the brunt of the wind without sustaining any damage, except in unusually stormy weather. Where the shelter is good, almost all of the bedding plants in general cultivation will flourish. But it is useless to attempt to grow delicate and brittle plants where they are exposed to the fury of the south-west gales. It is better in such cases to be content with dwarf, tough, hardy species that may be

depended upon, even at a sacrifice of variety. Tufted plants, like the Statices, Thrift, Saxifrages, Sedums, Polyanthus, Double-crimson Daisy, Phlox subulata, Candytuft, Pinks, Aubrietia, Arabis albida, and Alyssum saxatile, escape with little injury. Creeping plants, or such as will bear pegging down, like the hybrid Verbenas, Nierembergia gracilis, Lobelia Erinus, Helianthemum species, various Roses, etc., suggest themselves. Tree Pæonies, Chrysanthemums, Fuchsias, New Zealand Flax, and many other slightly tender things, will succeed well in warm sheltered localities. We might go on enumerating species of different degrees of duration and hardiness; but, as we have already observed, a very little shelter is sufficient to supply favourable conditions for an almost unlimited number of plants.

TOWN PLANTING.

The ensuing remarks apply to the larger towns, where the sooty deposit from the immense volume of smoke daily manufactured by the numerous fires renders it impossible to grow many plants that would otherwise flourish. There are, of course, other causes beside the smoke tending to destroy vegetation, or prevent the luxuriant growth we find in the open country, amongst which we may name drought. But as smoke is by far the worst enemy the gardener has to encounter in and around large towns, it will suffice to point out the most suitable subjects for planting in such localities to resist its evil effects. All plants suffer more or less, and, therefore, we have only to choose those which by nature are the least liable to injury. Evidently deciduous trees and shrubs possess an advantage over evergreen species in the total annual renewal of their foliage. Hence it follows that deciduous species should as a rule have the preference. But species with deciduous foliage are not all equally suitable, though this depends perhaps nearly as much on the moisture within reach of their roots, as upon the deleterious effects of an impure atmosphere. Taking London as an example, it will be seen that certain trees and shrubs grow freely, and for a month or two retain the freshness of spring. The Plane stands first in this category, and being a handsome umbrageous tree should be freely planted. The Common Ash, Poplars, Laburnum, Thorns, several species of Pyrus, Ailanthus glandulosa, and the Elm,

also thrive satisfactorily, taking the adverse conditions into consideration. The Lime is a very handsome tree, but it is so frequently infested with caterpillars, which destroy the beauty of its foliage in early summer, that it cannot be recommended for town planting. Where the open space is considerable, many other species may be added, such as the Maples, Horse Chestnuts, False Acacia, and Turkey Oak.

Deciduous shrubs include: Hibiscus Syriacus, Lilacs, Viburnum Lantana, Rhus Typhina, Diervilla in variety, Leycesteria formosa, Rhus Cotinus, Hypericum calycinum, etc.

Evergreen shrubs should not be altogether excluded. Those with smooth glossy leaves, like Aucuba Japonica, Ligustrum latifolium, Rhododendrons, Box, Euonymus, Thujopsis dolabrata, and Ivy, succeed best, owing to the action of the rain being more effectual in cleansing the epidermis than in those species with hairy foliage. The same remark applies to herbaceous plants. Thus Tulips, Hyacinths, Narcissuses, etc., may be successfully grown, provided the other conditions be favourable. Tufted evergreen herbaceous plants, on the other hand, will not answer so well. Helleborus orientalis, Eranthis hyemalis, Iris Germanica, Sweet William, Chrysanthemums, Candytuft, Mignonette, Virginian Stock, are amongst some of the easiest to cultivate in crowded quarters. It is almost unnecessary to mention that much may be done to keep plants in health and vigour by free use of the syringe and a good look-out after vermin. Sometimes a batch of annuals will disappear almost as suddenly as if a flight of locusts had visited them. The fact is, the moths frequenting such places are very numerous in proportion to the vegetation, and consequently unless the caterpillars are sought out while they are quite young they rapidly devour everything green within their reach. In conclusion, we may observe that plants, like animals, require extra care and attention under artificial conditions; and only those who really delight in the beauties of nature will undertake the culture of their favourites under such a combination of adverse circumstances as we find in the midst of our smoky towns.

INDEX

OF THE ENGLISH AND LATIN NAMES OF THE PLANTS DESCRIBED OR REFERRED TO IN PART I., INCLUDING SOME OF THEIR MORE IMPORTANT SYNONYMS.

Those names printed in *italics* are either synonyms or species incidentally mentioned.

AAR

	PAGE
AARON'S Beard	76
Abele	418
ABELIA	220
— floribunda	221
— rupestris	221
— triflora	221
— uniflora	221
ABIES	425
— alba	427
— — cærulea	427
— — echinoformis	427
— — glauca	427
— — minima	427
— Albertiana	428
— *Alcoquiana*	428
— amabilis	431
— Apollinis	429
— balsamea	429
— bracteata	430
— *Brunoniana*	428
— Canadensis	428
— *candicans*	431
— Cephalonica	429
— Cilicica	431
— Douglasii	428
— — Standishiana	428
— — taxifolia	428
— excelsa	426
— — Clanbrasiliana	426
— — horizontalis	426
— — inverta	426
— — monstrosa	426
— — nana	426
— — pendula	426
— — pygmæa	426
— — pyramidalis	426
— *firma*	428
— *Fraseri*	429
— grandis	431
— Hookeriana	428

ACA

	PAGE
Abies *Hudsonica*	429
— *Jezoensis*	428
— *lasiocarpa*	431
— *leioclada*	431
— *Lowiana*	431
— magnifica	432
— Menziesii	427
— *Mertensiana*	428
— *microsperma*	428
— *Morinda*	427
— nigra	427
— — rubra	427
— nobilis	429
— Nordmanniana	430
— *obovata*	427
— *orientalis*	427
— Parsonsii	431
— *Pattoniana*	428
— pectinata	429
— Pichta	431
— *Pindrow*	431
— Pinsapo	430
— *Reginæ Amaliæ*	429
— *religiosa*	430
— *Sibirica*	431
— Smithiana	427
— *Tsuga*	428
— Veitchii	432
— *Webbiana*	431
— *Williamsonii*	428
— *Wittmanniana*	427
Abietineæ	420
Abobra viridiflora	207
ABRONIA	385
— arenaria	386
— umbellata	386
Acacia, False	125
— Rose	125
— Thorn	125
Acanthaceæ	355

ACA

	PAGE
ACANTHOLIMON glumaceum	382
— venustum	382
ACANTHUS *latifolius*	355
— *longifolius*	355
— mollis	355
— spinosus	355
— *spinosissimus*	355
ACER	108
— campestris	108
— circinatum	109
— Colchicum	109
— — rubrum	109
— cordifolium	109
— *cucullatum*	109
— *dasycarpon*	108
— *dissectum*	109
— eriocarpum	108
— *laciniatum*	109
— *lætum*	109
— *Lobelii*	109
— *Mono*	109
— Monspessulanum	108
— *Negundo*	110
— *nigrum*	109
— *palmatum*	109
— Pennsylvanicum	109
— *pictum*	109
— platanoides	109
— polymorphum	109
— Pseudoplatanus	108
— rubrum	108
— saccharinum	108
— septemlobum	109
— striatum	109
— Tataricum	109
ACHILLEA	250
— *Ægyptiaca*	251
— Clavennæ	251
— filipendulina	251
— Millefolium	251
— Ptarmica	251
— tomentosa	251
ACONITUM	19
— Lycoctonum	19
— Napellus	19
Acorus Calamus	461
Acroclinium roseum	256
Acrogens	542
Actæa spicata	19
Actinidia polygama	78
Adam's Needle-and-Thread	516
Adder's Tongue	554
— — Yellow	494
ADENOCARPUS intermedius	117
ADIANTUM	544
— Capillus-Veneris	544
— *pedatum*	545
ADONIS	9
— æstivalis	10
— Pyrenaica	10

ALS

	PAGE
Adonis vernalis	10
ÆSCULUS	105
— Californica	107
— *carnea*	105
— *coccinea*	105
— *discolor*	107
— *flava*	107
— glabra	106
— Hippocastanum	105
— Indica	105
— *macrostachya*	107
— *Ohiotensis*	106
— pallida	106
— Pavia	106
— *purpurascens*	107
— rubicunda	105
ÆTHIONEMA	52
— coridifolium	53
— jucunda	53
African Lily	514
AGAPANTHUS *minor*	514
— *præcox*	514
— umbellatus	514
AGAVE Americana	493
AGERATUM Mexicanum	230
Agrostemma	71
Agrostis nebulosa	541
— *plumosa*	541
— *Spica-venti*	541
— *Steveni*	541
AILANTHUS glandulosa	98
Aira flexuosa	541
Ajax	486
Ajuga reptans	370
AKEBIA quinata	34
Alchemilla	148
Alder	415
Alismaceæ	464
Alisma Plantago	464
ALLIUM *azureum*	518
— *flavum*	518
— Moly	518
— *odorum*	518
— roseum	518
— *suaveolens*	518
Allosorus crispus	545
Almond	142
ALNUS cordifolia	415
— glutinosa	415
— — asplenifolia	415
— — aurea	415
— — imperialis	415
— — laciniata	415
— — quercifolia	415
— *incana*	415
— *serrulata*	415
Alonsoa incisifolia	337
ALOYSIA citriodora	359
Alsophila Colensoi	544
— *pruinata*	544

ALS

	PAGE
ALSTRŒMERIA *aurantiaca*	492
— *aurea*	492
— pelegrina	492
— *psittacina*	492
Alternanthera amœna	392
— *sessilis*	392
— *spathulata*	392
ALTHÆA *frutex*	84
— officinalis	80
— rosea	80
ALYSSUM	48
— *Gemonense*	48
— maritimum	48
— saxatile	48
Amaranthaceæ	388
AMARANTHUS	389
— caudatus	391
— hypochondriacus	391
— *melancholicus*	391
— *salicifolius*	391
— *tricolor*	391
Amaryllideæ	480
AMARYLLIS *lutea*	482
— Belladonna	480
Amber	77
Amberboa	266
AMELANCHIER	177
— *Botryapium*	178
— Canadensis	177
— ovalis	178
— *spicatus*	178
— vulgaris	177
American Cowslip	376
AMMOBIUM alatum	259
AMORPHA fruticosa	123
Ampelideæ	103
Ampelopsis hederacea	104
— tricuspidata	104
AMSONIA	298
— *ciliata*	299
— *latifolia*	298
— *salicifolia*	299
— Tabernæmontana	298
Amygdalus	140
Anacardiaceæ	111
ANAGALLIS	378
— *arvensis*	378
— *Breweri*	379
— *fruticosa*	379
— Indica	378
— Monelli	379
— *Parksii*	379
— *Phillipsi*	379
— *phœnicea*	379
— *tenella*	378
ANCHUSA	321
— *Italica*	321
— *officinalis*	321
— sempervirens	321
ANDROMEDA	277

AQU

	PAGE
Andromeda axillaris	278
— calyculata	277
— *Canadensis*	277
— Mariana	277
— *multiflora*	278
— polifolia	277
— *rosmarinifolia*	277
— *rotundifolia*	277
— *rubra*	277
— *salicifolia*	278
— *speciosa*	278
Andropogon argenteus	541
— *strictus*	541
ANDROSACE	374
— *ciliata*	375
— *lactea*	375
— *lanuginosa*	375
ANEMONE	6
— angulosa	6
— Apennina	9
— *blanda*	9
— Coronaria	7
— elegans	8
— fulgens	8
— Hepatica	6
— hortensis	8
— *hybrida*	8
— Japonica	8
— nemorosa	9
— palmata	9
— *pavonina*	8
— Pulsatilla	8
— ranunculoides	8
— *stellata*	8
— sylvestris	8
— *thalictroides*	5
Angelica Tree	213
Anonaceæ	27
Antennaria dioica	260
— *Margaritacea*	260
Anthemis tinctoria	250
ANTHERICUM Liliago	527
— Liliastrum	527
— ramosum	527
ANTHYLLIS Barba-Jovis	122
— Vulneraria	122
ANTIRRHINUM majus	339
— *Orontium*	339
Apocyneæ	297
APOCYNUM androsæmifolium	299
— *cannabinum*	299
— *Venetum*	299
Aponogeton distachyus	465
Apple Gourd	207
AQUILEGIA	16
— alpina	16
— arctica	17
— Canadensis	16
— *formosa*	17
— glandulosa	16

AQU

	PAGE
Aquilegia jucunda	16
— Skinneri	17
— vulgaris	16
Arabis albida	45
— *Androsace*	46
— *alpina*	45
— blepharophylla	45
— Caucasica	45
— lucida	45
— *procurrens*	46
— *verna*	46
Aralia	213
— Chinensis	213
— *Ginseng*	213
— *hispida*	213
— *Mandshurica*	213
— *nudicaulis*	213
— *papyrifera*	214
— *racemosa*	213
— *Sieboldii*	214
— spinosa	213
Araliaceæ	213
Araucaria	435
— *Bidwillii*	436
— *Braziliana*	436
— *excelsa*	436
— imbricata	435
Arbor Vitæ, American	444
— Chinese	446
— Siberian	444
Arbutus Andrachne	279
— procera	279
— Unedo	278
Archangelica purpurea	213
Arctostaphylos alpina	279
Arctotis *acaulis*	263
— *breviscapa*	262
— speciosa	262
— *undulata*	263
Aretia Vitaliana	375
Argemone	39
— grandiflora	40
— *hispida*	40
— Mexicana	39
Aristolochia Clematitis	398
— Sipho	398
Aristolochiaceæ	397
Armeniaca	140
Armeria	380
— *alpina*	380
— cephalotes	381
— *leucantha*	380
— *maritima*	380
— plantaginea	380
— vulgaris	380
Arnica montana	260
Aroideæ	461
Aronicum	261
Arrow-head	465
Arthrotaxis	435

AST

	PAGE
Arum	462
— *Dracunculus*	463
— *Italicum*	461
— *maculatum*	461
Arundinaria falcata	540
Arundo Donax	541
— *Phragmitis*	541
Asarum Europæum	398
Asclepias	300
— Cornuti	301
— *Douglasii*	301
— *incarnata*	301
— *Syriaca*	301
— tuberosa	300
— *variegata*	301
Asclepiadeæ	300
Ash, Common	294
— Flowering	293
— Gold-barked	294
— Manna	294
— Mountain	173
— Weeping	294
Asimina triloba	27
Asparagus *Broussonetii*	528
— *officinalis*	528
— *tenuifolius*	528
Aspen	418
Asperula azurea var. setosa	225
— odorata	225
Asphodelus	526
— fistulosus	527
— luteus	526
— ramosus	527
Aspidistra *elatior*	531
— *lurida*	531
— *punctata*	531
Aspidium aculeatum	549
— *angulare*	549
— *anomophyllum*	549
— *caryotideum*	549
— *falcatum*	549
— *Fortunei*	549
— *lobatum*	549
— *lonchitioides*	549
— Lonchitis	549
Asplenium	546
— Adiantum-nigrum	547
— *alternifolium*	546
— Ceterach	547
— Filix-fœmina	547
— — incisum	547
— — Rhæticum	547
— *Germanicum*	546
— *lanceolatum*	547
— marinum	547
— Ruta-muraria	546
— *septentrionale*	546
— Trichomanes	546
— *viride*	547
Aster	231

AST

	PAGE
Aster alpinus	232
— Amellus	232
— bicolor	232
— *cæspitosus*	232
— *discolor*	232
— *elegans*	232
— *formosissimus*	232
— grandiflorus	232
— *horizontalis*	232
— lævis	232
— Nova-Angliæ	232
— *pyrenæus*	232
— *Tripolium*	231
— *sericeus*	232
Aster, China	233
Asterocephalus	227
Astilbe	178
— barbata	178
— *decandra*	179
— *Japonica*	178
— *rivularis*	179
Astrantia major	210
Astragalus alopecuroides	129
— hypoglottis	129
— Onobrychis	129
— Monspessulanus	129
Athanasia annua	255
Athyrium	547
Atragene alpina	3
Atriplex Halimus	388
— *hortensis rubra*	388
Atropa Belladonna	329
Aubrietia	47
— *Campbellii*	47
— deltoidea	47
— *Græca*	47
— *grandiflora*	47
— *pupurea*	47
Aucuba Japonica	216
— — varieties	217
— Himalaica	216
Auricula	373
Azalea	284
— *arborescens*	285
— calendulacea	285
— *Indica*	286
— *liliiflora*	286
— *mollis*	285
— nudiflora	285
— Pontica	284
— *Sinensis*	285
— *viscosa*	285
Babiana	478
Baccharis halimifolia	236
Balm, Bastard	367
Balsam	95
Balsamineæ	86
Bambusa *aurea*	541

BER

	PAGE
Bambusa falcata	540
— Fortunei	540
— — argenteo vittata	540
— — variegata	540
— *Japonica*	540
— Limonii	541
— Metake	540
— nigra	540
— *pubescens*	541
— *verticillata*	541
— *violacea*	541
— viridi-glaucescens	540
Baneberry	19
Baptisia	114
— alba	115
— australis	115
— tinctoria	115
Barberry	29
Bartonia	203
— *aurea*	204
Bastard Balm	367
— Indigo	123
Bayberry	413
Bay Willow	417
Bearberry	279
Beard Grass	541
Bear's Breech	355
Bee Balm	364
— Larkspur	17
— Orchis	467
Beech, Common	410
— Copper	411
— Purple	410
— variegated	411
— Weeping	411
— — Fern	551
Begonia	207
— *discolor*	207
— Evansiana	207
— Veitchii	208
Begoniaceæ	207
Bellevalia operculata	525
Bellis	234
— perennis	235
— — aucubæfolia	235
Belvedere Cypress	388
Benthamia fraqifera	216
Benzoin odoriferum	393
Berberideæ	28
Berberidopsis corallina	31
Berberis	28
— aquifolia	30
— aristata	29
— Bealii	30
— *buxifolia*	29
— *Chinensis*	30
— *concinna*	30
— Darwinii	29
— dulcis	29
— empetrifolia	29

BER

	PAGE
Berberis *fascicularis*	31
— Fortunei	31
— glumacea	30
— ilicifolia	30
— *intermedia*	31
— *Japonica*	31
— *Knightii*	30
— *microphylla*	29
— *Nepalensis*	31
— *nervosa*	30
— *pinnata*	31
— repens	30
— stenophylla	30
— *umbellata*	29
— vulgaris	29
Bergamot, Wild	364
Beta Chilensis	388
Betony	368
BETULA alba	414
— — laciniata	415
— — pendula	414
— — populifolia	415
— nana	415
Betulaceæ	414
BIGNONIA capreolata	351
— *radicans*	352
Bignoniaceæ	351
Bilberry	274
BIOTA *aurea*	446
— *compacta*	447
— *elegantissima*	447
— *filiformis*	446
— *flagelliformis*	446
— *glauca*	447
— *Meldensis*	446
— *monstrosa*	447
— *Nepalensis*	447
— orientalis	446
— *pyramidalis*	447
— *Sieboldii*	447
Birch	414
Bird Cherry	141
Bird's-foot Trefoil	122
Birthroot	531
Bistort	383
Bitter Nut	407
Bitter-Sweet	327
Black Alder	100
Black Bryony	533
Blackthorn	140
Bladder Nut	111
— Senna	127
Blechnum boreale	545
Blessed Thistle	266
BLITUM virgatum	388
Blue-bell	520
Blumenbachia insignis	205
BOCCONIA	40
— cordata	41
— Japonica	41

BUT

	PAGE
Bærkhausia rubra	268
Bog Asphodel	533
— Bean	302
— Myrtle	413
— Pimpernel	378
BOMAREA Salsilla	493
Borage	320
Borraginaceæ	319
BORRAGO officinalis	320
BOTRYCHIUM Lunaria	554
Bottle Gourd	207
Bouvardia triphylla	226
Bow-wood	402
Box	401
Box Thorn	327
BRACHYCOME iberidifolia	235
Bracken	545
Brake, Common	545
— Rock	545
Brandy Bottles	35
BRASSICA	50
Briar, Capuchin	161
— Persian	161
— Sweet	161
Bridgesia spicata	387
Briza gracilis	541
— *media*	541
Bromeliaceæ	469
Brompton Stock	44
Broom, Common	121
— Portugal	119
— Spanish	119
Brooklime	350
Browallia demissa	334
— *elata*	334
Broussonetia papyrifera	402
Bryanthus erectus	279
Bryonia dioica	206
Bryony, Black	533
— Red	206
BUDDLEA	347
— *crispa*	348
— globosa	347
— Lindleyana	348
Buffalo Berry	397
Bugle	370
Bugloss, Viper's	320
BULBOCODIUM vernum	535
Bulrush	464, 538
BUPLEURUM fruticosum	209
Burnet	148
Burning Bush	101
Bur-Reed	464
Butcher's Broom	530
Butterbur	231
Buttercup	12
Butterfly-weed	300
Butternut	407
Buttonweed	265
BUTOMUS umbellatus	465

BUX

	PAGE
Buxus Balearica	401
— *Japonica*	401
— sempervirens	401
— — angustifolia	401
— — arborescens	401
— — myrtifolia	401
— — rosmarinifolia	401
— — rotundifolia	401
Cacalia coccinea	260
Cacteæ	208
Caiophora lateritia	204
Calampelis scabra	353
Calandrinia discolor	75
— grandiflora	75
— umbellata	75
Calceolaria	335
— *alba*	335
— amplexicaulis	335
— *arachnoidea*	335
— *corymbosa*	335
— *crenata*	335
— *Fothergillii*	335
— integrifolia	335
— *jovellana*	336
— *Kellyana*	335
— *plantaginea*	335
— thrysiflora	336
— *violacea*	336
Calendula officinalis	262
Calico Bush	286
Calla *Æthiopica*	461
— palustris	461
Callicarpa Americana	359
Calliopsis	243
Callirhoe	82
— *cordifolia*	82
— *digitata*	82
— involucrata	82
— *Papaver*	82
— pedata	82
Callistemma	233
Callistephus hortensis	233
Callitris quadrivalvis	441
Calluna vulgaris	275
Calochortus	499
— *elegans*	500
— Leichtlinii	500
— nitidus	500
— venustus	500
Calophaca Wolgarica	128
Caltha	12
— palustris	13
Calycanthaceæ	22
Calycanthus	22
— *asplenifolius*	22
— *bullatus*	22
— floridus	22
— *glaucus*	23

CAS

	PAGE
Calycanthus inodorus	22
— *lævigatus*	23
— *macrophyllus*	23
— *nanus*	22
— occidentalis	22
— *Pennsylvanicus*	22
— *præcox*	23
Calystegia pubescens	317
Candleberry	413
Candytuft	51
Canna	468
— *angustifolia*	469
— *coccinea*	469
— *edulis*	469
— *glauca*	468
— *Indica*	468
— *speciosa*	469
— *Warscewiczii*	469
Cannabinaceæ	403
Cannabis sativa	403
Canterbury Bells	269
Cantua bicolor	312
— *laxifolia*	312
— *pyrifolia*	312
Camassia esculenta	518
Camellia Japonica	78
Campanula	268
— Carpathica	270
— Garganica	271
— glomerata	269
— grandiflora	270
— *hederacea*	268
— latifolia	269
— Medium	269
— nobilis	270
— persicifolia	270
— *pumila*	271
— pyramidalis	268
— rapunculoides	271
— rotundifolia	270
— *speciosa*	271
— Trachelium	269
Campanulaceæ	268
Cape Gooseberry	329
— Jessamine	300
— Marigold	255
Caper-bush	53
Caper Spurge	399
Capparideæ	53
Capparis spinosa	53
Caprifoliaceæ	218
Caprifolium Italicum	219
Cassandra	277
Cassia Marilandica	138
— *nictitans*	138
— *procumbens*	138
Cassiopea	277
Castor-oil Plant	400
Castanea vesca	411
Castilleja	351

CAT

	PAGE
CATALPA	352
— bignonioides	353
— *Bungei*	353
— *syringæfolia*	353
CATANANCHE cærulea	267
— lutea	267
Catmint	366
Cat's-tail	464
CARAGANA	127
— Altagana	128
— *angustifolia*	128
— arborescens	128
— Chamlagu	128
— frutescens	128
— *latifolia*	128
— *microphylla*	128
— *pygmæa*	128
— *sophoræfolia*	128
— *triflora*	128
CARDAMINE	46
— latifolia	47
— pratensis	46
— trifolia	47
Carduus afer	266
— *Marianus*	266
Carex Japonica	538
— *paludosa*	538
— *pendula*	538
— *pseudo-Cyperus*	538
— *riparia*	538
— *sylvatica*	538
Carnation	62
Carolina Allspice	22
CARPINUS Betulus	412
Carthamus tinctorius	266
CARYA *alba*	407
— *amara*	407
— *glabra*	407
— *olivæformis*	407
— *porcina*	407
— *tomentosa*	407
Caryophylleæ	62
CEANOTHUS	102
— Americanus	103
— azureus	103
— *floribundus*	103
— *Lobbianus*	103
— Veitchianus	103
Cedar, African or Silver	434
— Creeping	440
— of Goa	449
— Indian or Deodar	434
— of Lebanon	433
— Prickly	441
— Red	439
— White	448
Cedronella cana	367
— *Mexicana*	367
CEDRUS	433
— *Africana*	434

CER

	PAGE
Cedrus argentea	434
— Atlantica	434
— Deodara	434
— — crassifolia	434
— — robusta	434
— — tenuifolia	434
— — viridis	434
— Libani	433
Celastrineæ	100
CELSIA Cretica	337
— *urticæfolia*	337
CELTIS *Audibertiana*	405
— australis	405
— *crassifolia*	405
— *occidentalis*	405
— *pumila*	405
CENTAUREA	264
— *Amberboi*	266
— Americana	265
— Babylonica	266
— *candidissima*	266
— *Clementei*	266
— Cyanus	265
— *dealbata*	266
— *depressa*	266
— *macrocephala*	266
— *moschata*	266
— *nigra*	265
— *orientalis*	266
— Ragusina	266
Centaury	303
CENTRANTHUS	226
— ruber	227
— macrosiphon	227
Cephalanthera grandiflora	467
CEPHALARIA Tartarica	229
CEPHALOTAXUS	455
— drupacea	456
— Fortunei	455
— — *fœmina*	456
— — *mas*	455
— — *pendula*	455
— *Harringtonii*	456
— *pedunculata*	456
— *umbraculifera*	456
CERASTIUM	73
— Biebersteini	73
— *glomeratum*	74
— tomentosum	73
— *triviale*	74
Cerasus	140
— *Japonica*	142
CERCIS	138
— Canadensis	139
— Chinensis	139
— *Japonica*	139
— Siliquastrum	138
Cerinthe major	319
— *minor*	319
— *retorta*	319

CET

	PAGE
Ceterach officinarum	517
Chamæcyparis	447, 450
Chamærops excelsa	461
— *Fortunei*	461
— *humilis*	461
Chænomeles Japonica	173
Chænostoma fastigiatum	345
Chamæcyparis sphæroidea	448
Chaste-tree	360
CHEIRANTHUS	44
— alpinus	45
— Cheiri	44
— Marshallii	45
CHELONE	342
— barbata	343
— campanulata	342
— centranthifolia	342
— *gentianoides*	342
— glabra	342
— *Lyonsii*	343
— major	343
— *obliqua*	342
— *purpurea*	342
— *speciosa*	342
Chenopodium album	388
— *atriplicis*	388
— *purpurascens*	388
— *scoparium*	388
Chenopodiaceæ	388
Cherry	140
— Bird	141
— Winter	328
— -pie	325
Chestnut, Horse	105
— Sweet	411
China Aster	233
Chinese Pink	66
CHIMONANTHUS fragrans	23
— *grandiflorus*	23
Chionanthus Virginica	291
Chlora perfoliata	302
— — *grandiflora*	303
Chloris barbata	541
— *elegans*	541
— *radiata*	541
Christ's Thorn	102
Christmas Rose	14
CHRYSANTHEMUM	251
— carinatum	255
— coronarium	254
— Indicum	252
— *Leucanthemum*	252
— Parthenium	253
— roseum	253
— *segetum*	252
— Tchihatchewii	254
— *tricolor*	255
CHRYSOBACTRON *Hookeri*	527
— Rossii	527
Chrysocephalum helichrysoides	258

CŒL

	PAGE
Chymocarpus pentaphyllus	93
Cineraria acanthifolia	260
— *maritima*	260
Cistineæ	55
CISTUS	56
— Cyprius	57
— ladaniferus	56
— laurifolius	57
— Monspeliensis	57
— populifolius	57
— purpureus	57
— salvifolius	57
CITRUS	97
— Aurantium	98
Cladium Mariscus	538
CLADRASTIS Amurensis	135
— lutea	135
CLARKIA elegans	198
— *gauroides*	198
— pulchella	198
— *rhomboidea*	198
CLEMATIS	2
— alpina	3
— azurea	4
— cærulea	4
— Flammula	2
— Fortunei	4
— florida	4
— graveolens	3
— Hendersoni	3
— integrifolia	4
— *Jackmanii*	5
— lanuginosa	4
— *monstrosa*	4
— montana	2
— *pallida*	4
— *patens*	4
— *rubro-violacea*	5
— *Sieboldii*	4
— Sibirica	4
— Viorna	3
— Vitalba	2
— Viticella	3
CLEOME	53
— rosea	54
— speciosissima	54
— spinosa	54
Clerodendron Bungei	359
— *fœtidum*	359
CLIANTHUS Dampieri	127
— puniceus	126
Clove	62
COBÆA	311
— *macrostema*	312
— scandens	312
— *stipularis*	312
Cocoa-nut	460
Cocos nucifera	460
Codlins-and-Cream	197
Cœlestinia ageratoides	230

CŒL

PAGE

Cœlestinia cærulea . . . 230
Coffee Tree, Kentucky . . 138
COLCHICUM autumnale . . 535
COLEUS Blumei 361
— Gibsoni 361
— Veitchii 361
Colletia 102
COLLINSIA 341
— bicolor 342
— *grandiflora* 342
— *heterophylla* 342
— *multicolor* 342
— *verna* 342
COLLOMIA *Cavanillesii* . . 308
— coccinea 308
— *grandiflora* 308
Columbine 16
COLUTEA arborescens . . . 127
Comaclinium aurantiacum . . 245
Compass Plant 239
Comfrey 320
COMMELYNA cœlestis . . . 537
— *tuberosa* 537
Commelynaceæ 536
Compositæ 229
Comptonia asplenifolia . . 413
Coniferæ 419
CONVALLARIA majalis . . . 528
Convolvulaceæ 315
CONVOLVULUS 316
— *althæoides* 317
— *arvensis* 316
— *Dahurica* 317
— *major* 318
— *minor* 316
— mutabilis 318
— *pubescens* 317
— *Sepium* 316
— *Soldanella* 316
— tricolor 316
Coral-berry 221
Coral-tree 134
Corbularia 486
Corchorus 145
CORDYLINE *australis* . . . 528
— *indivisa* 528
COREOPSIS 243
— *aristosa* 244
— auriculata 244
— *coronata* 244
— Drummondii 244
— *lanceolata* 244
— tenuifolia 244
— tinctoria 243
— — atropurpurea . . . 243
— *tripteris* 244
— *verticillata* 244
CORIARIA 113
— myrtifolia 113
Coriarieæ 113

COW

PAGE

Coris Monspeliensis . . . 378
Corn Cockle 72
— Marigold 252
— Poppy 38
Cornaceæ 215
Cornelian Cherry . . . 216
CORNUS 215
— alba 216
— Canadensis 216
— florida 216
— fragifera 216
— mas 216
— *sanguinea* 216
— *Suecica* 216
CORONILLA 129
— *coronata* 130
— Emerus 130
— *glauca* 130
— Iberica 130
— minima 130
— montana 130
— varia 130
Cortusa Matthioli . . . 375
CORYDALIS 43
— *cava* 43
— lutea 43
— *Marshalliana* . . . 43
— nobilis 43
— *solida* 43
— *tuberosa* 43
Corylopsis spicata . . . 192
CORYLUS Avellana . . . 412
Corypha australis . . . 458
COSMANTHUS fimbriatus . . 314
— grandiflorus . . . 314
— *viscidus* 314
Cosmea 246
COSMIDIUM Burridgeanum . 246
— *Engelmanni* . . . 246
— *filifolium* 246
Cosmophyllum cacaliæfolium . 241
COSMOS 246
— bipinnatus 246
— diversifolius . . . 247
COTONEASTER 175
— affinis 175
— bacillaris 176
— buxifolia 176
— frigida 176
— microphylla 176
— Simonsii 176
— thymifolia 176
— vulgaris 175
— Wheeleri 176
Cotton Grass 538
Cotyledon Umbilicus . . . 191
Cow Parsnip 212
Cowberry 274
Cowslip, American . . . 376
— Common 372

PAGE

Cowslip, Virginian . . . 322
Crab, American 172
— Cherry 172
— Chinese 172
— Siberian 172
Cranberry 274
— American 275
Cranesbill 87
CRASSULA 188
— coccinea 189
Crassulaceæ 188
CRATÆGUS 173
— *arbutifolia* 177
— coccinea 174
— Crus-galli 175
— *Douglasii* 175
— *glabra* 177
— *laurifolia* 175
— *lucida* 175
— *Mexicana* 175
— *monogyna* 174
— *ovalifolia* 175
— Oxyacantha 174
— *prunifolia* 175
— Pyracantha 174
— *pyracanthifolia* 175
— *pyrifolia* 175
— *tomentosa* 175
Creeping Jenny 377
Crepis rubra 268
Crinum Capense 482
— *longifolium* 482
CROCUS 478
— *aureus* 479
— biflorus 479
— *lagenæflorus* 479
— luteus 479
— nudiflorus 480
— *pulchellus* 479
— reticulatus 479
— sativus 479
— speciosus 479
— *stellaris* 479
— Susianus 479
— variegatus 479
— vernus 479
— *versicolor* 479
Crown Imperial 506
CRUCIANELLA stylosa 226
Cruciferæ 43
CRYPTOGRAMME crispa . . . 545
CRYPTOMERIA *elegans* 452
— Japonica 452
— — Lobbii 452
— — nana 452
— — variegata 452
— — viridis 452
Cuckoo Flower 46
— Pint 461
Cucumber Gourd 207

PAGE

Cucumber Tree 26
Cucumis erinaceus 207
— *myriocarpus* 207
Cucurbita Pepo 206
— — *aurantiiformis* 207
— — *limonis* 207
— — *maliformis* 207
— — *pyriformis* 207
Cucurbitaceæ 206
CUMMINGIA trimaculata . . . 526
Cunninghamia Sinensis . . . 434
Cunoniaceæ 178
CUPHEA 195
— *eminens* 196
— ignea 196
— *Jorullensis* 196
— *platycentra* 196
— *silenoides* 196
— *strigillosa* 196
— *viscosissima* 196
Cupressineæ 438
CUPRESSUS 447
— *aromatica* 448
— *Californica* 448
— *Corneyana* 449
— *ericoides* 450
— *excelsa* 449
— *fragrans* 448
— *funebris* 449
— *glandulosa* 449
— *Goveniana* 449
— *Kewensis* 449
— *Knightiana* 449
— *Lambertiana* 448
— Lawsoniana 447
— — compacta 448
— — erecta-viridis 448
— — gracilis 448
— — intermedia 448
— — laxa 448
— — minima 448
— — nivea 448
— — stricta 448
— *Lusitanica* 449
— Macnabiana 449
— macrocarpa 448
— Nutkaensis 448
— sempervirens 449
— — fastigiata 449
— — horizontalis 449
— thyoides 448
— *torulosa* 449
— *Uhdeana* 449
Cupuliferæ 408
Cuscuta 315
— *Epithymum* 316
— *Europæa* 316
Cyathea dealbata 544
— *medullaris* 544
CYCLAMEN 375

CYC

	PAGE
Cyclamen Coum	376
— Europæum	375
— hederæfolium	376
— *Ibericum*	376
— *Neapolitanum*	376
— Persicum	375
CYCLOBOTHRA lutea	500
— purpurea	500
Cydonia	171
Cynoglossum longiflorum	325
— *montanum*	325
— *officinale*	325
Cyperaceæ	537
Cyperus longus	538
Cypripedium Calceolus	467
— *candidum*	467
— *guttatum*	467
— *spectabile*	467
Cypress, Belvedere	388
— Deciduous or Bald	451
— Golden	446
— Upright	449
Cyrtomium falcatum	549
CYSTOPTERIS *dentata*	548
— *Dickieana*	548
— fragilis	548
— *montana*	548
CYTISUS	120
— *albus*	119
— *argenteus*	121
— *capitatus*	121
— *Laburnum*	117
— nigricans	121
— purpureus	117, 121
— scoparius	121
— *sessilifolius*	121
Czackia Liliastrum	527

DACTYLIS glomerata	541
Dactyloctenium Ægyptiacum	541
Dacrydium	457
Dabeocia polifolia	277
Daffodil	486
DAHLIA	236
— coccinea	239
— *frustranea*	236
— *imperialis*	239
— *superflua*	236
— variabilis	236
— *Zimapani*	247
Daisy, Common	235
— Hen-and-Chickens	235
— Michaelmas	231
— Ox-eye	252
— Swan-River	235
Dame's Violet	49
Dammara australis	438
DAPHNE	394
— alpina	394

DIE

	PAGE
Daphne Cneorum	395
— collina	394
— *Dauphin*	394
— Fortunei	394
— Laureola	394
— Mezereum	394
— Pontica	394
— *Verloti*	394
Date Palm	458
DATURA	330
— ceratocaula	331
— *fastuosa*	331
— *humilis*	331
— *Metel*	331
— *meteloides*	331
— *Stramonium*	331
— *Tatula*	331
Day Lily	511
Deadly Nightshade	329
Decumaria sarmentosa	184
DELPHINIUM	17
— Ajacis	17
— cardinale	17
— Consolida	17
— elatum	17
— formosum	18
— grandiflorum	18
— — album	18
— magnificum	18
— nudicaule	18
Desfontainia Chilensis	327
— *Hookeri*	327
— *spinosa*	327
DEUTZIA	184
— *corymbosa*	184
— crenata	184
— gracilis	184
— *Fortunei*	184
— *scabra*	184
— *staminea*	184
Devil-in-a-Bush	15
Dianthera Americana	357
DIANTHUS	62
— barbatus	65
— Caryophyllus	62
— Chinensis	66
— *deltoides*	67
— *Gallicus*	67
— Hispanicus	66
— *fruticosus*	65
— plumarius	65
— *superbus*	67
— *Virgineus*	67
Dicksonia antarctica	544
— *squarrosa*	544
DICTAMNUS albus	96
Didiscus cæruleus	211
DIELYTRA	41
— chrysantha	42
— eximia	42

DIE

PAGE

Dielytra formosa 42
— spectabilis 42
Diervilla 222
— amabilis 222
— — varieties 222
— *Canadensis* 223
— *floribunda* 223
— *florida* 222
— *Japonica* 222
— *Middendorfiana* . . . 223
— *multiflora* 223
— *pupurata* 223
— rosea 222
Digitalis 348
— *ferruginea* 349
— *grandiflora* 349
— *lutea* 349
— *ochroleuca* 349
— purpurea 349
— *Thapsi* 349
Dimorphanthus Mandshuricus . 213
Dimorphotheca pluvialis . . 255
Dionæa muscipula . . . 191
Dioscoreæ 533
Diospyros *Kaki* 289
— *Lotus* 289
— Virginiana 289
Diplacus 347
— *aurantiacus* 347
— *cardinalis* 346
— glutinosus 347
— grandiflorus 347
— *latifolius* 347
— *puniceus* 347
Dipsaceæ 227
Dipsacus sylvestris . . . 227
Dittany 96
Dodecatheon 376
— *integrifolium* 377
— *Jeffreyanum* 377
— Meadia 376
Dogbane 299
Dog's-tooth Violet . . . 494
Dogwood 216
Doronicum Caucasicum . . 261
— Pardalianches . . . 261
Dracæna 528
Dracocephalum . . . 366
— *Altaicum* 366
— Argunense 366
— Moldavicum 367
— peregrinum 366
— *Ruyschianum* 367
Dracunculus vulgaris . . . 463
Dropwort 143
Drosera Anglica 191
— *intermedia* 191
— *rotundifolia* 191
Droseraceæ 191
Drosophyllum Lusitanicum . . 191

ERA

PAGE

Dutchman's Pipe 398
Dwale 329

Ebenaceæ 288
Eccremocarpus scaber . . 353
Echeveria metallica . . . 188
Echinacea serotina . . . 242
Echinops 263
— cornigerus 263
— Ritro 264
— Ruthenicus 264
— sphærocephalus . . . 264
Echium 320
— *Creticum* 320
— *pomponium* 320
— *violaceum* 320
— *vulgare* 320
Edwardsia grandiflora . . 137
Eglantine 160
Elæagnaceæ 395
Elæagnus angustifolia . . 396
— argentea 396
— *crispa* 396
— *hortensis* 396
— *Japonica* 396
— *longipes* 396
— *multiflora* 396
— *pungens* 396
— *reflexa* 396
— *umbellata* 396
Elm, Common 404
— Scotch 405
— Wych 403
Eleusine Barcelonensis . . 541
Eleutherococcus senticosus . . 214
Embothrium coccineum . . 395
Emilia sagittata . . . 260
Endymion campanulata . . 520
Ephedra *altissima* . . . 457
— *distachya* 457
— *monostachya* 457
Epigæa repens 278
Epilobium angustifolium . . 197
— hirsutum 197
Epimedium 32
— *alpinum* 32
— *diphyllum* 33
— *lilacinum* 33
— macranthum 32
— *pinnatum* 33
— *roseum* 33
— *Sinense* 33
— *sulphureum* 33
— violaceum 32
Equisetaceæ 554
Equisetum maximum . . . 554
— *Telmateia* 554
Eragrostis elegans . . . 541
Eranthis hyemalis . . . 14

ERC

PAGE

Ercilla spicata 387
EREMOSTACHYS *Iberica* . . . 369
— laciniata 369
Erianthus Ravennæ . . . 541
ERICA 275
— *arborea* 275, 276
— carnea 275
— *ciliaris* 276
— *cinerea* 275
— *codonoides* 276
— *herbacea* 275
— *Hibernica* 276
— Mediterranea 276
— *polytrichifolia* . . . 276
— *scoparia* 276
— *Tetralix* 275
— vagans 276
— *vulgaris* 275
Ericaceæ 274
ERIGERON *alpinum* . . . 234
— — *grandiflorum* . . . 234
— glabellum 234
— *Roylei* 234
— speciosum 234
Erinus alpinus 348
Eriobotrya Japonica . . . 177
Eriophorum 538
Eritrichium nanum . . . 324
ERYNGIUM alpinum . . . 210
— amethystinum . . . 210
— Bourgati 210
— *maritimum* 210
ERYSIMUM 50
— *Arkansanum* 50
— *asper* 50
— *Marshallii* 45
— *Marschallianum* . . . 50
— Peroffskianum . . . 50
Erythræa Centaurium . . . 303
ERYTHRINA 134
— Crista-galli 134
— *laurifolia* 135
ERYTHRONIUM Americanum . 494
— Dens-canis 494
ESCALLONIA *floribunda* . . 186
— macrantha 186
— *pterocladon* 186
— rubra 186
Escalloniaceæ 178
ESCHSCHOLTZIA 41
— Californica 41
— tenuifolia 41
Eucalyptus 193
— *pulverulenta* 193
EUCHARIDIUM concinnum . . 200
— *grandiflorum* 200
Eucnide 203
Eugenia Ugni 194
EUONYMUS Americanus . . 101
— *atropupureus* 101

FER

PAGE

Euonymus Europæus . . . 101
— Japonicus 101
— — varieties 101
— *latifolius* 101
— radicans, varieties . . . 101
Eupatorium cannabinum . . 231
EUPHORBIA 399
— *amygdaloides* 400
— Cyparissias 400
— *Helioscopia* 400
— Lathyris 399
Euphorbiaceæ 399
EURYA Japonica 78
— latifolia variegata . . 78
Eurybia 232
Eutoca Menziesii . . . 314
— *multiflora* 314
— *Ortgiesiana* 315
— *speciosa* 314
— *viscida* 314
— *Wrangeliana* 314
Evening Primrose . . . 199
Everlasting Flowers . 256, 258, 259
Exochorda grandiflora . . 144

FABIANA imbricata . . 326
FAGUS 410
— *antarctica* 411
— *betuloides* 411
— *ferruginea* 411
— sylvatica 410
— — Americana . . . 411
— — aspleniifolia . . . 411
— — cuprea 411
— — foliis argenteo-variegatis . 411
— — foliis aureo variegatis . 411
— — incisa 411
— — macrophylla . . . 411
— — pendula 411
— — purpurea 411
— — — pendula . . . 411
— — quercifolia . . . 411
Fair Maids of France . . . 12
Farfugium grande . . . 260
Fat-Hen 388
FATSIA horrida 214
— Japonica 214
Featherfoil 379
Feather Grass 541
Fedia Cornucopiæ . . . 227
Fennel, Giant 211
Fenzlia 308
— *dianthoides* 309
Ferdinanda eminens . . . 241
Fern, Beech 551
— Hard 545
— Hart's-tongue . . . 546
— Lady 547
— Male 549

	PAGE
Fern, Marsh	550
— Oak	551
— Parsley	545
— Royal	553
— Sweet	413
— Sweet Mountain	550
Ferraria *undulata*	471
Ferula communis	211
— *glauca*	212
— *Tingitana*	212
Festuca ovina	541
Feverfew	253
Ficus Carica	402
Ficoideæ	208
Fig	402
Figwort	341
Filices	542
Fir, Balm of Gilead	429
— Balsam	429
— Scotch	421
— Silver	429
— Spruce	426
Fitzroya Patagonica	443
Flag, Sweet	461
— Yellow	474
Flax	86
— New Zealand	515
Flowering Ash	293
— Rush	465
Fly Orchis	467
Flytrap	299
Fog-fruit	359
Forget-me-not	323
Forsythia	296
— *Fortunei*	297
— suspensa	297
— viridissima	296
Fortunæa Chinensis	408
Fothergilla alnifolia	191
Four-o'clock Flower	387
Foxglove	349
Francoa sonchifolia	182
Francoaceæ	178
Frankenia	61
— lævis	62
Frankeniaceæ	61
Fraxinella	96
Fraxinus	293
— excelsior	294
— — heterophylla	294
— — laciniata	294
— — monophylla	294
— *lentiscifolia*	294
— *longicuspis*	294
— Ornus	293
— rotundifolia	294
Fremontia Californica	84
French Honeysuckle	131
— Mulberry	359
— Willow	197

	PAGE
Fringe Tree	291
Fritillaria	500
— imperialis	500
— *Kamtchatkensis*	501
— *latifolia*	501
— *Meleagris*	501
— *pallidiflora*	501
— *Persica*	501
— *præcox*	501
— *Pyrenaicum*	501
Frog-bit	463
Fuchsia	200
— *coccinea*	201
— *conica*	202
— *discolor*	202
— fulgens	201
— globosa	201
— *gracilis*	201
— macrostema	201
— *Magellanica*	201
— *Riccartoni*	201
Funckia	513
— *albo-marginata*	513
— grandiflora	514
— lancifolia	513
— ovata	513
— Sieboldiana	513
— subcordata	514
— *undulata*	513
Furze, Common	120
— Irish	120
Fustic, Young	112
Gagea lutea	499
Gaillardia	248
— aristata	249
— *bicolor*	249
— *coronata*	249
— Drummondii	249
— *grandiflora*	249
— *picta*	249
— *Richardsoni*	249
— *tricolor*	249
Galanthus *Imperati*	483
— nivalis	483
— *plicatus*	483
Gale, Sweet	413
Galega	123
— *biloba*	124
— *officinalis*	124
— orientalis	123
— *Persica*	124
Garrya elliptica	217
Gaultheria procumbens	278
— Shallon	278
Gaura	202
— Lindheimeri	203
Gazania *Pavonia*	263
— *rigens*	263

GAZ

	PAGE
Gazania splendens	263
— *uniflora*	263
GENISTA	118
— alba	119
— *Hispanica*	119
— radiata	119
— sagittalis	119
— *scoparia*	121
— tinctoria	119
GENTIANA	303
— acaulis	303
— alpina	303
— Andrewsii	304
— asclepiadea	304
— *Bavarica*	304
— *Catesbœi*	304
— cruciata	304
— *excisa*	303
— *gelida*	305
— lutea	304
— *Pneumonanthe*	303
— — *alba*	305
— *punctata*	305
— Pyrenaica	304
— Saponaria	304
— *septemfida*	305
— verna	303
Gentianaceæ	302
Gentianella	303
Geraniaceæ	86
GERANIUM	87
— *Endressii*	89
— *Ibericum*	87
— *Lancastriense*	87
— phæum	89
— platypetalum	87
— *pratense*	89
— *Robertianum*	87
— sanguineum	87
— striatum	87
— *sylvaticum*	87
— *tuberosum*	89
Gerardia	351
Germander	370
Gesneraceæ	354
GEUM *coccineum*	147
— Chiloense	147
Giant Fennel	211
— Stock	44
GILIA	308
— capitata	309
— *coronopifolia*	310
— dianthoides	309
— tricolor	309
Gingko biloba	456
GLADIOLUS	475
— *Brenchleyensis*	476
— *Byzantinus*	475
— *cardinalis*	476
— *communis*	475

GRA

	PAGE
Gladiolus cuspidatus	476
— *floribundus*	476
— Gandavensis	476
— *laccatus*	476
— *psittacinus*	476
— *ramosus*	476
— *ringens*	476
— *undulatus*	476
Glechoma hederacea	366
GLEDITSCHIA	137
— *horrida*	137
— *inermis*	137
— monosperma	137
— *Sinensis*	137
— triacanthos	137
Globe Amaranth	392
— Flower	13
Globularieæ	379
GLOBULARIA	379
— cordifolia	379
— *nudicaulis*	380
— vulgaris	379
Glory Pea	126
Glumiferæ	537
Glycine	124
GLYPTOSTROBUS heterophyllus	451
— pendulus	451
Gnaphalium flavissimum	258
— *lanatum*	258
Gnetaceæ	457
Gnetum	457
Goat's Beard	144
— Rue	123
Godetia	199
— *grandiflora*	199
— *rubicunda*	199
Golden Rod	236
Goldilocks	236
Gomphrena globosa	392
Goniolimon elatum	381
Gooseberry, Cape	329
— Gourd	207
Goose-foot	388
Gorse	120
Gourd, Apple	207
— Bottle	207
— Cucumber	207
— Gooseberry	207
— Hercules' Club	207
— Lemon	207
— Orange	207
— Pear	207
— Plate de Corse	207
— Siphon	207
— Snake	207
— Trumpet	207
Gramineæ	538
Grammanthes gentianoides	190
Grape Vine	103
Grass of Parnassus	181

GRA

	PAGE
Grasses	541
Greek Valerian	310
Greenweed	119
Grevillea robusta	395
Grindelia grandiflora	235
— *inuloides*	235
— *squarrosa*	235
Griselinia littoralis	217
— *lucida*	217
Gromwell	323
Grossulariaceæ	178
Ground Ivy	366
Groundsel	261
— Tree	236
Guelder Rose	224
Gunnera	192
— scabra	193
Gum-tree	193
Gymnocladus Canadensis	138
Gymnogramme leptophylla	552
Gymnothrix latifolia	541
Gynerium argenteum	539
Gypsophila	68
— *acutifolia*	69
— *elegans*	69
— *glauca*	69
— *muralis*	69
— paniculata	68
— prostrata	69
— *repens*	69
— *Saxifraga*	68
— *Steveni*	69

Hack-berry	405
Hakea	395
Halesia	287
— *diptera*	288
— *parviflora*	288
— tetraptera	288
Halimodendron argenteum	127
Haloragæ	192
Hamamelideæ	191
Harebell	270
Hare's-foot Grass	541
Harpalium rigidum	246
Hart's-tongue Fern	546
Hawthorn	174
Hazel	412
Heath	275
— St. Dabeoc's	277
Heather	275
Heartsease	58
Hedera	214
— Helix	215
— — varieties	215
— Canariensis	215
— — varieties	215
— *Colchica*	215
— *Hibernica*	215

HEL

	PAGE
Hedera Rœgneriana	215
Hedysarum Coronarium	131
Helenium	249
— *atropurpureum*	250
— *grandiflorum*	250
Helianthemum	55
— Algarvense	55
— *canum*	55
— formosum	56
— *guttatum*	55
— *macranthum*	56
— *ocymoides*	55
— *polifolium*	55
— *pulverulentum*	56
— *Tuberaria*	56
— vulgare	56
— — croceum	56
— — grandiflorum	56
— — roseum	56
— — Surrejanum	56
Helianthus annuus	245
— argyrophyllus	245
— multiflorus	245
— orgyalis	245
— *tuberosus*	245
Helichrysum	257
— *acuminatum*	258
— apiculatum	258
— bracteatum	258
— *chrysanthum*	258
— *macrocephalum*	258
— *petiolatum*	258
— *Stœchas*	258
Heliotrope, Winter	231
Heliotropium	325
— *grandiflorum*	326
— Peruvianum	325
— *suaveolens*	326
— *Voltaireanum*	326
— *Volterrianum*	326
Helipterum	258
— *brachyrhynchum*	258
— *exiguum*	258
— *Humboldtii*	258
— incanum	258
— Sandfordii	258
— *speciosissimum*	258
Hellebore, Black	533
— White	533
Helleborine	467
Helleborus	14
— *atropurpureus*	15
— *atrorubens*	15
— *Colchicus*	15
— *fœtidus*	15
— *lividus*	15
— niger	14
— Olympicus	14
— *orientalis*	14
— viridis	15

HEL

	PAGE
Helonias bullata	533
— *latifolia*	533
Henbane	329
HEMEROCALLIS	511
— *crocea*	512
— *disticha*	512
— *Dumortieri*	512
— flava	512
— fulva	512
— *graminea*	512
— *Kwanso*	512
— *minor*	512
— *Middendorfii*	512
Hemlock, Ground	453
Hemp Agrimony	231
— Common	403
— Indian	299
Hepatica	6
— *angulosa*	6
— *triloba*	6
HERACLEUM *asperum*	212
— *Austriacum*	212
— *eminens*	212
— flavescens	212
— *giganteum*	212
— *Panaces*	212
— *Persicum*	212
— *Sphondylium*	212
Hercules' Club Gourd	207
HESPERIS	49
— *inodora*	49
— matronalis	49
— *Sibirica*	49
HESPEROSCORDIUM hyacinthinum	526
Heuchera	179
HIBISCUS	83
— Africanus	83
— *militaris*	83
— *palustris*	83
— roseus	83
— Syriacus	84
— Trionum	83
Hickory	407
— Broom	407
— Shell-bark	407
— Swamp	407
— White-heart	407
Hieracium aurantiacum	268
Hippeastrum	480
HIPPOPHAE rhamnoides	396
Hippuris	192
Hogweed	212
Holly, Common	99
— Sea	210
Hollyhock	80
Honey Locust	137
Honesty	47
Honeysuckle	218
— Dutch	219
— Evergreen	220
— French	131

HYP

	PAGE
Honeysuckle, Late Red	219
— Dark-leaved	219
— Trumpet	220
Hop	403
— -Hornbeam	412
— -tree	96
Hordeum jubatum	541
Horse Chestnut	105
Horse-sugar	288
Horsetail	554
Hornbeam	412
— Hop	412
Hoteia barbata	178
— *Japonica*	178
Hottonia palustris	379
House Leek	190
Houstonia cærulea	226
Hulthemia	171
Humulus Lupulus	403
HUMEA elegans	260
Hyacinth, Wild	520
HYACINTHUS *amethystinus*	524
— *non-scriptus*	520
— orientalis	523
— *Romanus*	525
HYDRANGEA	182
— *arborescens*	183
— *Azisai*	183
— Hortensia	182
— *Japonica*	182
— Otaksa	182
— paniculata	183
— *petiolaris*	183
— *quercifolia*	183
— *scandens*	183
— *stellata*	182
— *Thunbergii*	183
Hydrangeaceæ	178
Hydrastis Canadensis	19
Hydrocharidaceæ	463
HYDROCHARIS Morsus-Ranæ	463
Hydroleaceæ	312
Hydrophyllaceæ	312
Hydrophyllum	312
Hymenophylleæ	552
HYMENOPHYLLUM	552
— Tunbridgense	552
— unilaterale	552
— *Wilsoni*	552
Hymenoxis Californica	249
HYOSCYAMUS niger	329
Hypericineæ	76
HYPERICUM	76
— Androsæmum	77
— calycinum	76
— elatum	77
— elodes	77
— hircinum	77
— *Kalmianum*	77
— *prolificum*	77

IBE

	PAGE
IBERIS	50
— amara	51
— Garrexiana	52
— Gibraltarica	52
— odorata	52
— Pruiti	52
— semperflorens	52
— sempervirens	52
— Tenoreana	52
— umbellata	51
Ice Plant	209
Idesia polycarpa	60
ILEX	99
— Aquifolium	99
— *crenata*	100
— *Dahoon*	100
— *ferox*	100
— *glabra*	100
— *latifolia*	100
— *laurifolia*	100
— *myrtifolia*	100
— *ovata*	100
— *variegata*	100
— *verticillata*	100
Ilicineæ	99
ILLICIUM	23
— *anisatum*	24
— religiosum	24
Immortelles	256, 258, 259, &c.
IMPATIENS	94
— Balsamina	95
— *Noli-me-tangere*	95
Indian Bean	353
— Corn	541
— Cress	92
— Pink	66
Inkberry	100
IONOPSIDIUM acaule	50
Ipomœa hederacea	318
— *purpurea*	318
Ipomopsis	308
— *elegans*	310
IRESINE	391
— Herbstii	392
— *Lindeni*	392
Iridaceæ	469
Iris, English	474
— Spanish	474
IRIS	472
— arenaria	474
— *cristata*	473
— fimbriata	474
— Florentina	473
— Germanica	472
— lurida	473
— *Monnieri*	474
— *ochroleuca*	473
— Persica	474
— *pratensis*	473
— Pseudacorus	474

JUG

	PAGE
Iris reticulata	475
— scorpioides	475
— *Sibirica*	473
— *Sisyrinchium*	471
— spectabilis	474
— spuria	473
— Susiana	472
— tuberosa	475
— variegata	473
— *versicolor*	473
— xiphioides	474
— Xiphium	474
Iron wood	412
Itea Virginica	186
Ivy	215
— Ground	366
IXIA *bulbifera*	477
— *conica*	477
— *grandiflora*	477
— *liliago*	477
— *maculata*	477
— *patens*	477
— *tricolor*	477
— *viridiflora*	477

JACOB'S Ladder	310
Jasione montana	272
— *perennis*	272
Jasmineæ	289
JASMINUM	289
— *Azoricum*	291
— fruticans	290
— *heterophyllum*	291
— humile	290
— nudiflorum	290
— *odoratissimum*	291
— officinale	289
— *pubigerum*	291
— revolutum	291
— *Wallichianum*	291
Jessamine	289
— Cape	300
Jerusalem Sage	369
Jonquil	489
Jubæa spectabilis	461
Judas Tree	138
Juglandaceæ	406
JUGLANS	406
— *cinerea*	407
— *intermedia*	407
— nigra	407
— regia	407
— — aspleniifolia	407
— — heterophylla	407
— — laciniata	407
— — monophylla	407
— — serotina	407
— — tenera	407
— — variegata	407

JUN

PAGE

Juncaceæ 537
Juncaginaceæ 466
Juncus 537
Juniper, Common 439
— Frankincense 440
— Irish 439
— Swedish 439
JUNIPERUS 438
— *Bermudiana* 441
— Chinensis 438
— communis 439
— — alpina 439
— — Canadensis . . . 439
— — compressa 439
— — depressa 439
— — Hibernica 439
— — Suecica 439
— — pendula 439
— *cupressifolia* 440
— *densa* 440
— *dzupacca* 441
— *dumosa* 440
— excelsa 440
— *flagelliformis* 438
— fragrans 441
— Japonica 438
— *Langoldiana* 441
— *macrocarpa* 441
— Oxycedrus 441
— Phœnicea 441
— *procumbens* 438
— prostrata 440
— *recurva* 440
— *religiosa* 440
— *repens* 440
— Sabina 440
— *Sabinioides* 440
— squamata 440
— *tamariscifolia* 440
— thurifera 440
— Virginiana 439
— — alba 439
— — cinerascens . . . 439
— — glauca 439
— — humilis 439
— — pendula 439
Jupiter's Beard 122

KADSURA Japonica . . 27
KALMIA angustifolia . . 286
— glauca 286
— *hirsuta* 286
— latifolia 286
KALOSANTHES coccinea . . 189
KERRIA 145
— Japonica 146
King's Spear 526
KITAIBELIA vitifolia . . . 79
Knapweed 265

LAS

PAGE

Knightia excelsa 395
KNIPHOFIA 514
— aloides 514
— *Burchellii* 515
— *media* 515
— *pumila* 515
— *uvaria* 514
Kochia scoparia 388
KŒLREUTERIA paniculata . . 104
Koniga maritima 48

LABIATÆ 360
Laburnum, Common . . 117
— Evergreen 114
— Purple 117
— Scotch 118
LABURNUM 117
— *Adami* 117
— alpinum 118
— *Alschingeri* 117
— *autumnale* 117
— *confertum* 118
— *crispum* 117
— *Parksii* 117
— *pendulum* 118
— ramentaceum 118
— *serotinum* 118
— vulgare 117
— *Weldeni* 118
Lady Fern 547
Lady's Bower 2
— Cushion 380
— Garters 541
— Mantle 148
— Slipper 467
— Smock 46
Lagenaria vulgaris . . . 207
Lagurus ovatus 541
Lamarkia aurea 541
Lambkill 286
LAMIUM 367
— *album* 368
— *Galeobdolon* 368
— *maculatum* 368
— *purpureum* 368
Lantana 358
— *Camara* 359
Lapageria rosea 532
Larch 432
LARDIZABALA biternata . . 34
LARIX *Americana* 432
— *Dahurica* 432
— Europæa 432
— *Griffithiana* 432
— *Ledebourii* 432
— *leptolepis* 433
— *occidentalis* 432
Lasthenia glabrata . . . 251
Lastrea 549

LAT

	PAGE
Lathyrus	131
— *Armitageanus*	132
— grandiflorus	132
— latifolius	132
— Magellanicus	132
— odoratus	131
— *sylvestris*	132
— Tingitanus	131
— tuberosus	133
Lauraceæ	392
Laurel	393
— — Magnolia	25
— Alexandrian	141
— Caucasian	141
— Cherry	141
— Colchican	141
— Common	141
— Grecian	141
— Mountain	286
— Portugal	141
— Sheep	286
— Versailles	141
— Wood	394
Laurestine	223
Laurus	393
— *Sassafras*	393
— Benzoin	393
Lavandula *dentata*	361
— *lanata*	361
— *Spica*	361
— *Stœchas*	361
— vera	361
Lavatera	81
— arborea	81
— trimestris	81
Lavender	361
— Sea	381
Lawrencella rosea	268
Leather Flower	3
Ledum latifolium	287
— palustre	287
Leguminosæ	113
Lemon Gourd	207
Lemon-scented Verbena	359
Lent Lily	486
Lentibularineæ	370
Leonurus Cardiaca	368
Leopard's Bane	261
Lepachys columnaris	213
Leptochloa gracilis	541
Leptodactylon Californicum	309
Leptosiphon	308
— *Androsaceus*	309
— *densiflorus*	309
— *luteus*	309
— *roseus*	309
Leucoium	483
— æstivum	484
— vernum	483
Leucothoë	277

LIL

	PAGE
Lever-wood	412
Leycesteria	221
— formosa	222
Liatris *elegans*	231
— *odoratissima*	231
— scariosa	231
— spicata	231
Libertia *formosa*	470
— *ixioides*	470
— *Magellanica*	470
Libocedrus Chilensis	442
— decurrens	442
— *Doniana*	442
— tetragona	442
Ligularia Kæmpferi	260
Ligustrum	292
— coriaceum	293
— Japonicum	293
— lucidum	293
— *ovalifolium*	293
— Sinensis	293
— vulgare	292
Lilac, Common	294
— Persian	296
Liliaceæ	494
Lilium	501
— *atromaculatum*	508
— *atrosanguineum*	508
— *angustifolium*	511
— *aurantiacum*	508
— auratum	507
— *autumnale*	509
— *Brownii*	505
— bulbiferum	507
— *callosum*	510
— Canadense	509
— candidum	505
— Carniolicum	509
— *Carolinianum*, Catesby	507
— —, Michaux	509
— *Catesbæi*	507
— *Chalcedonicum*	509
— *Colchicum*	509
— *concolor*	508
— *cordifolium*	504
— *croceum*	507
— *Davuricum*	508
— *excelsum*	510
— *eximium*	504
— *flavum*	510
— *Fortunei*	506
— giganteum	504
— *hæmatochroum*	508
— *Hartwegii*	509
— *Hookeri*	504
— *Humboldtii*	509
— Isabellinum	510
— *Japonicum*, Don	505
— Japonicum, Thunberg	505
— *lancifolium*	508

LIL

	PAGE
Lilium lancifolium, Paxton	506
— Leichtlinii	510
— *linifolium*	511
— longiflorum	504
— *maculatum*	509
— Martagon	508
— *Maximowiczii*	511
— *medeoloides*	507
— monadelphum	509
— *Neilgherricum*	504
— *Nepalense*	505
— *odorum*	505
— *parviflorum*	509
— *peregrinum*	505
— *Philadelphicum*	507
— *polyphyllum*	509
— Pomponium	511
— Ponticum	509
— *pseudo-tigrinum*	511
— *pulchellum*	508
— *pumilum*	511
— Pyrenaicum	510
— roseum	503
— *Sinicum*	508
— *speciosum*, Andrews	506
— speciosum Thunberg	506
— — album	507
— — punctatum	507
— — rubrum	507
— *spectabile*, Salisbury	508
— *spectabile*, Link	507
— *spicatum*	506
— *striatum*	505
— *superbum*	509
— *Szovitsianum*	509
— *Takesima*	504
— tenuifolium	511
— testaceum	510
— *Thomsonianum*	503
— *Thunbergianum*	508
— tigrinum	506
— *venustum*	508
— *vitellinum*	508
— *Walkeri*	509
— *Wallichianum*	504
— *Washingtonianum*	506
Lily, African	514
— Guernsey	480
— Lent	486
— Orange	507
— St. Bruno's	527
— St. Bernard's	527
— White	505
— -of-the-Valley	528
Lime-tree	85
Limnantheæ	86
LIMNANTHES Douglasii	93
Limnanthemum nymphæoides	302
LINARIA	337
— lapina	338

LOB

	PAGE
Linaria bipartita	338
— Cymbalaria	338
— Dalmatica	337
— *Elatine*	339
— Macroura	338
— purpurea	338
— *saxatilis*	338
— *Spartea*	338
— *spuria*	339
— triornithophora	338
— *tristis*	338
— vulgaris	337
Lindelofia spectabilis	325
Linden	85
Lineæ	86
Ling	275
LINNÆA borealis	218
Linosyris vulgaris	236
LINUM	86
— alpinum	86
— *arboreum*	86
— campanulatum	86
— *flavum*	86
— grandiflorum	86
— perenne	86
— usitatissimum	86
LIPPIA citriodora	359
— *nodiflora*	359
LIQUIDAMBAR	192
— imberbe	192
— *orientalis*	192
— Styraciflua	192
LIRIODENDRON tulipifera	26
— — integrifolia	26
— — obtusiloba	26
Listera ovata	467
LITHOSPERMUM	322
— *arvense*	323
— *fruticosum*	323
— *Gastoni*	323
— officinale	323
— prostratum	323
— pupureo-cæruleum	323
Livistona australis	458
LOASA	204
— *acanthifolia*	204
— aurantiaca	204
— *Pentlandica*	205
— *picta*	205
— *Placei*	204
— *tricolor*	205
Loaseæ	203
LOBELIA	272
— *amœna*	273
— *bicolor*	272
— *campanulata*	272
— *cardinalis*	273
— *Dortmanna*	272
— Erinus	272
— *fulgens*	273

LOE

PAGE

Lobelia ignescens . . . 273
— *splendens* 273
— *Tupa* 273
— *urens* 272
Lobeliaceæ 268
Loganiaceæ 301
Lomaria Spicant . . . 545
London Pride 180
Lonicera 218
— *Belgica* 219
— brachypoda 220
— — aureo-reticulata . . 220
— *Brownii* 220
— Caprifolium 219
— *Chinensis* 220
— *coccinea* 220
— Etrusca 219
— flexuosa 220
— fragrantissima . . . 220
— *Japonica* 220
— Periclymenum . . . 218
— *pubescens* 220
— quercifolia 219
— sempervirens 220
— *serotina* 219
— *Standishii* 220
— Xylosteum 220
Loosestrife, Purple . . . 196
— Yellow 377
Lopezia coronata . . . 202
Lophospermum 339
— erubescens 340
— *Hendersoni* 340
— scandens 340
Loquat 177
Loranthaceæ 397
Loranthus Europæus . . . 397
Lords-and-Ladies . . . 461
Lotus 122
— *corniculatus* 122
— *Jacobæus* 122
— *Gebelia* 122
— *pupureus* 122
— *siliquosus* 122
Love-in-a-Mist 15
Love-lies-bleeding . . . 391
Lowea 171
Lunaria 47
— *annua* 47
— *biennis* 47
— rediviva 47
Lungwort 322
Lupinus 115
— *affinis* 117
— luteus 116
— mutabilis 115
— nanus 116
— polyphyllus 115
— tomentosus 115
— varius 117

MAI

PAGE

Luzula 537
Lychnis 71
— alpina 73
— Chalcedonica 72
— Cœli-rosa 72
— coronaria 71
— *diurna* 73
— Flos-cuculi 73
— fulgens 73
— Githago 72
— grandiflora 73
— *Haageana* 73
— Sieboldii 73
— *vespertina* 73
— Viscaria 73
Lycium Barbarum . . . 327
— *Chinense* 327
— *Europæum* 327
Lycopodiaceæ 554
Lycopodium 554
Lycoris aurea 482
Lysimachia 377
— *angustifolia* 378
— Ephemerum 378
— hybrida 378
— latifolia 378
— Nummularia 377
— thyrsifolia 377
— vulgaris 377
Lythrarieæ 195
Lythrum Salicaria . . . 196
— — roseum superbum . . 196

Maackia Amurensis . . 135
Macleaya cordata . . 41
Maclura aurantiaca . . 402
Madaria elegans . . . 250
Magnolia 24
— acuminata 26
— Campbellii 26
— conspicua 25
— *discolor* 25
— *Fraseri* 25
— glauca 25
— *Gordoniana* 25
— grandiflora 24
— *latifolia* 25
— *Lennei* 25
— *longifolia* 25
— macrophylla 26
— *Oxoniensis* 25
— purpurea 25
— tripetala 25
— *Umbrella* 25
— *Yulan* 25
Magnoliaceæ 23
Mahonia, see Berberis . . 30
Maianthemum bifolium . . 530
Maiden-hair Fern . . . 544

MAI

	PAGE
Maiden-hair Tree	456
Maize	541
MALCOLMIA maritima	49
Male Fern	549
MALOPE	79
— *grandiflora*	79
— malacoides	79
— trifida	79
MALVA	81
— crispa	82
— lateritia	82
— Mauritiana	82
— moschata	82
— *rotundifolia*	82
— *sylvestris*	82
Malvaceæ	79
Malvastrum	82
Mammillaria	208
Mammoth Tree	437
Mandragora autumnalis	329
— *officinalis*	329
Maple, Bird's-eye	108
— Common	108
— Curled	108
— Eagle's Claw	109
— Kite's Claw	109
— Norway	109
— Snake	109
— Sugar	108
Marantaceæ	467
Mare's Tail	192
Marica convoluta	470
Marigold, African	248
— Cape	255
— Common	262
— Corn	252
— French	247
Marsh Fern	550
— Mallow	80
— Marigold	13
— Reed	541
Martynia	354
— *fragrans*	355
— *lutea*	355
— *proboscidea*	355
Marvel of Peru	386
Masterwort	210
Mastich	112
MATTHIOLA	44
— annua	44
— bicornis	44
— *fenestralis*	44
— Græca	44
— incana	44
MAURANDYA *antirrhiniflora*	340
— Barclayana	340
— *semperflorens*	340
Maximowiczia	26
— *Chinensis*	27
May	174

MIM

	PAGE
May Apple	33
Meadow Beauty	194
— Rue	5
— Sweet	143
— Saffron	535
MECONOPSIS *aculeata*	40
— Cambrica	40
— *Nepalensis*	40
— *Wallichii*	40
Medicago	121
Megacarpæa polyandra	43
Melampyrum	351
Melanthaceæ	533
Melastomaceæ	194
MELIA *Azedarach*	99
— Japonica	99
Meliaceæ	98
MELIANTHUS major	110
Melica altissima	541
Melittis grandiflora	367
— *Melissophyllum*	367
Menispermaceæ	27
MENISPERMUM	28
— Canadense	28
— — Carolinianum	28
Mentha piperita	362
— *Pulegium*	362
— rotundifolia	362
MENTZELIA	203
— aurea	204
— bartonioides	204
Menyanthes trifoliata	302
MENZIESIA	276
— cærulea	276
— *empetrifolia*	277
— *globularis*	277
— polifolia	277
Mertensia maritima	322
— *Virginica*	322
MESEMBRYANTHEMUM	208
— cordifolium	209
— crystallinum	209
— tricolor	209
Meum Athamanticum	213
Mezereon	394
Michaelmas Daisy	231
Microcachrys	457
Microsperma bartonioides	204
Mignonette	55
Mikania scandens	230
Milkweed	301
Milkwort	61
Milfoil, Water	192
MIMULUS	345
— cardinalis	346
— cupreus	346
— *glutinosus*	347
— *guttatus*	345
— luteus	345
— moschatus	346

MIM

	PAGE
Mimulus quinquevulnerus	346
— *rivularis*	345
— *variegatus*	345
Mitchella repens	226
Mitella	179
Mirabilis	386
— *dichotoma*	387
— Jalapa	386
— *longiflora*	387
Mistletoe	397
Mocker Nut	407
Molopospermum cicutarium	213
Moonseed	28
Moonwort	554
Monarda didyma	364
— *fistulosa*	364
Moneywort	377
Monkey Flower	345
Monkshood	19
Monocotyledons	458
Montagnæa	241
Montanoa heracleifolia	241
Montbretia *aurea*	477
— *fucata*	478
— *rosea*	478
Montia fontana	74
Moraceæ	401
Moræa *bicolor*	471
— *edulis*	471
— *iridioides*	471
— *Sisyrinchium*	471
— *Tenoriana*	471
— *villosa*	471
Morina	228
— longifolia	229
Morna	256
— *nitida*	257
Morus *alba*	402
— *nigra*	402
— *rubra*	402
Mother-of-thousands	338
Motherwort	368
Mountain Laurel	286
— Tobacco	260
Mulberry, Common	402
— French	359
— Paper	402
Mullein	336
Musa coccinea	467
— *Ensete*	467
— *Sinensis*	467
Musaceæ	467
Muscari botryoides	522
— *commutatum*	522
— comosum	522
— *Heldreichii*	522
— *luteum*	522
— *moschatum*	522
— racemosum	522
Musk Plant	346

NAR

	PAGE
Mutisia decurrens	266
— *speciosa*	266
Myosotidium nobile	324
Myosotis	323
— alpestris	324
— *arvensis*	324
— Azorica	324
— *cæspitosa*	324
— *collina*	324
— dissitiflora	324
— *lingulata*	324
— montana	324
— palustris	323
— *rupicola*	324
— sylvatica	324
— versicolor	324
Myrica aspleniifolia	413
— cerifera	413
— Gale	413
Myricaceæ	413
Myricaria	76
Myriophyllum	192
Myrtaceæ	193
Myrtilla	194
Myrtle	194
— Bog	413
Myrtus communis	194

Nageia Japonica	456
— *ovata*	457
Narcissus	484
— *albus*	488
— *aureus*	489
— *aurantius*	488
— *bicolor*	487
— biflorus	489
— *Broussonettii*	490
— Bulbocodium	486
— Calathinus	487
— *chrysanthus*	489
— dubius	489
— *elegans*	490
— *Gouani*	488
— gracilis	489
— incomparabilis	487
— intermedius	489
— *Italicus*	489
— Jonquilla	489
— juncifolius	489
— *lacticolor*	489
— Macleai	487
— *major*	486
— *Mediterraneus*	489
— *minor*	487
— *montanus*	487
— *moschatus*	487
— *ochroleucus*	489
— odorus	488
— pachybolbus	489

NAR

	PAGE
Narcissus Panizzianus	489
— *papyraceus*	489
— poculiformis	487
— *poetarum*	490
— poeticus	489
— *polyanthus*	489
— Pseudo-Narcissus	486
— *radiiflorus*	490
— *recurvus*	490
— *serotinus*	490
— *stellaris*	490
— Tazetta	489
— triandus	487
— *verbenensis*	490
— viridiflorus	490
Nardosmia fragrans	231
Narthecium ossifragrum	533, 537
Narthex Asafœtida	213
Nasturtium	92
Naumbergia thyrsiflora	377
Navelwort	191
— Venus's	325
Nectarine	140
NEGUNDO	110
— *aceroides*	110
— fraxinifolium	110
NEMOPHILA	313
— atomaria	314
— *aurita*	314
— insignis	313
— maculata	314
— *Menziesii*	313
— *phacelioides*	314
NEPETA *Cataria*	366
— *Glechoma*	366
— *longiflora*	366
— *macrantha*	366
— *Mussini*	366
NEPHRODIUM	549
— *abbreviatum*	550
— *æmulum*	550
— *affine*	550
— *atratum*	550
— *Borreri*	550
— *cristatum*	550
— *dilatatum*	550
— *erythrosorum*	550
— Filix-mas	549
— *montanum*	550
— *opacum*	550
— *Oreopteris*	550
— *rigidum*	550
— spinulosum	550
— *Thelypteris*	550
Nettle Tree	405
NERINE *Sarniensis*	480
NERIUM *Oleander*	299
New Zealand Flax	515
NICOTIANA	330
— *glauca*	330

ŒN

	PAGE
Nicotiana latissima	330
— *macrophylla*	330
— *rustica*	330
— *Tabacum*	330
— *Wigandioides*	330
NIGELLA	15
— damascena	15
— Hispanica	15
Nightshade, Deadly	329
Niphobolus Lingua	552
None-so-pretty	180
NOLANA *atriplicifolia*	318
— *lanceolata*	318
— *paradoxa*	318
— prostrata	318
Nolanaceæ	318
NUPHAR	35
— *advena*	36
— lutea	35
— pumila	35
Nut, Bitter	407
— Hazel	412
— Hickory	407
— Mocker	407
— Pecan	407
Nuttallia grandiflora	82
Nux vomica	301
Nyctaginaceæ	385
Nycterina Capensis	345
NYMPHÆA	35
— alba	35
— *nitida*	35
— odorata	35
— *pygmæa*	35
Nymphæaceæ	34
Nyssa aquatica	217
— *denticulata*	217
— *multiflora*	217
— *tomentosa*	217
— *uniflora*	217
— *villosa*	217

OAK, Bur	409
— Common	408
— Cork	410
— Evergreen	409
— Fern	551
— Red	409
— Scarlet	409
— Turkey	409
— Valonia	409
— White	409
— Yellow-barked	409
Obeliscaria pulcherrima	243
ŒNOTHERA	199
— *acaulis*	200
— biennis	199
— *chrysantha*	200
— Fræseri	200

ŒN

PAGE

Œnothera Lindleyana . . . 199
— *macrantha* 200
— *Missouriensis* . . . 200
— *odorata* 200
— *roseo-alba* 199
— *reptans* 199
— rubicunda 199
— *speciosa* 200
— taraxacifolia 200
— Whitneyi 199
Old Man's Beard . . . 2
OLEA *Europæa* 291
— ilicifolia 292
Oleaceæ 291
Oleander 299
Olive 291
Onagrarieæ 196
Onoclea sensibilis . . . 548
Onopordon Acanthium . . 266
— *horridum* 266
— *Tauricum* 266
Onosma Tauricum . . . 322
OMPHALODES linifolia . . 325
— verna 325
Ophioglosseæ 553
Ophioglossum vulgatum . . 554
Ophrys apifera 467
— *aranifera* 467
— *muscifera* 467
Opium Poppy 37
Opuntia Rafinesquiana . . 208
— *vulgaris* 208
Orange 98
— Osage 402
— Gourd 207
— Lily 507
— -root 19
Orchidaceæ 466
Orchis, Bee 467
— Fly 467
— Spider 467
Orchis mascula 466
— *Morio* 466
— *pyramidalis* 466
ORNITHOGALUM 520
— *aureum* 522
— nutans 521
— pyramidale 522
— Pyrenaicum 521
— umbellatum 521
Ornus Europæa 293
OROBUS albus 133
— *coccineus* 133
— *Jordani* 133
— luteus 133
— niger 133
— *tuberosus* 133
— *variegatus* 133
— vernus 133
Orpine 189

PAP

PAGE

Orris-root 473
Osage Orange 402
Osier, Golden 416
— Purple 417
Osmanthus aquifolius . . 292
— *ilicifolius* 292
OSMUNDA *cinnamomea* . . 553
— *Claytoniana* 553
— *interrupta* 553
— regalis 553
Osmundeæ 553
OSTRYA *carpinifolia* . . . 412
— *Virginica* 412
— vulgaris 412
Oswego Tea 364
Ourisia coccinea 350
Oxalideæ 86
OXALIS 93
— *Acetosella* 94
— Bowiei 94
— corniculata 94
— Deppei 94
— *floribunda* 94
— rosea 94
— *rubra* 94
— *Valdiviensis* 94
— violacea 94
Ox-eye Daisy 252
Oxlip 371
Oxycoccos macrocarpus . . 275
— *palustris* 274

PÆONIA 20
— albiflora 21
— decora 22
— *edulis* 21
— Moutan 21
— officinalis 21
— paradoxa 22
— *Sinensis* 21
— tenuifolia 22
— Wittmanniana . . . 22
PALAVA flexuosa 80
Paliurus aculeatus . . . 102
Palm 416
Palmaceæ 458
Palma-Christi 400
Pampas Grass 539
Panax Ginseng 213
— *horridum* 214
PANCRATIUM 490
— *Carolinianum* . . . 491
— Illyricum 490
— maritimum 490
— *rotatum* 491
Pansy 58
PAPAVER 37
— alpinum 37
— *bracteatum* 37

PAP

	PAGE
Papaver nudicaule	37
— orientale	37
— *pulcherrimum*	37
— *Pyrenaicum*	37
— Rhœas	38
— somniferum	37
Papaveraceæ	36
Papaw	27
Paper Mulberry	402
Papilionaceæ	113
Pasque-flower	8
Pardanthus Chinensis	476
Parechites Thunbergii	299
Paris quadrifolia	531
PARNASSIA	181
— asarifolia	181
— *Caroliniana*	181
— palustris	181
Parrot Flower	126
Parsley Fern	545
PASSIFLORA cærulea	206
Passifloreæ	205
PAULOWNIA imperialis	341
Pavia, see ÆSCULUS	105
Pea, Everlasting	132
— Lord Anson's	132
— Sweet	131
— Tangier	131
Pear Gourd	207
Pecan Nut	407
PECTIS angustifolia	230
Pedaliaceæ	354
Pedicularis	351
PELARGONIUM	89
— *capitatum*	91
— *grandiflorum*	89
— *graveolens*	91
— inquinans	90
— peltatum	91
— *quercifolium*	91
— zonale	90
Pennisetum longistylon	541
Pennyroyal	362
Pennywort	191
PENTSTEMON	343
— acuminatus	343
— barbatus	343
— cordifolius	344
— Digitalis	345
— diffusus	343
— gentianoides	344
— *Hartwegii*	344
— Jaffrayanus	345
— Murrayanus	345
— ovatus	344
— pulchellus	344
— speciosus	344
— Wrightii	344
Pepperidge	217
Peppermint	362

PHL

	PAGE
Perilla Nankinensis	362
PERIPLOCA Græca	301
Periwinkle	298
Pernettya angustifolia	278
— *mucronata*	278
— *speciosa*	278
Persian Ranunculus	10
Persica	140
Persimmon	289
Persoonia Toru	395
Perymenium discolor	241
Petasites vulgaris	231
PETUNIA	331
— *intermedia*	332
— nyctaginiflora	332
— *phœnicea*	332
— violacea	331
Phacelia congesta	314
Phalangium Liliago	527
Phalaris arundinacea	541
PHARBITIS	317
— hederacea	318
— hispida	318
— *Nil*, var. *limbata*	318
Phaseolus multiflorus	133
Phellodendron Amurense	97
Philadelpheæ	178
PHILADELPHUS	185
— *Chinensis*	186
— coronarius	185
— *hirsutus*	186
— inodorus	186
— Gordonianus	185
— grandiflorus	185
— *latifolius*	185
— Lewisii	186
— Satsumi	186
— *speciosus*	185
Philageria Veitchii	532
PHILESIA	531
— buxifolia	532
PHILLYREA	291
— angustifolia	292
— *ilicifolia*	292
— latifolia	292
— media	292
— *oleæfolia*	292
— *rosmarinifolia*	292
— *salicifolia*	292
PHLOMIS fruticosa	369
— Herba-Venti	369
— *Russelliana*	369
— *tuberosa*	369
PHLOX	305
— *acuminata*	306
— *Canadensis*	306
— *Carolina*	307
— *decussata*	306
— *divaricata*	306

PHL

	PAGE
Phlox Drummondii	308
— *frondosa*	307
— maculata	306
— *Nelsonii*	307
— *nivalis*	307
— *ovata*	307
— paniculata	306
— *pyramidalis*	306
— reptans	308
— *setacea*	307
— *stolonifera*	308
— *suaveolens*	306
— subulata	307
— *verna*	308
Phœnix dactylifera	458
Phormium tenax	515
Photinia	176
— arbutifolia	177
— Japonica	177
— serrulata	177
Phragmitis communis	541
Phygelius	340
— Capensis	341
Phyllocladus	457
Phyllodoce taxifolia	276
Physalis	328
— Alkekengi	328
— *edulis*	329
— *Peruviana*	329
Physianthus albicans	301
Physostegia imbricata	367
— *speciosa*	367
— *Virginiana*	367
Phyteuma campanuloides	272
— *orbiculare*	271
— *spicatum*	271
Phytolacca decandra	387
— icosandra	387
Phytolaccaceæ	387
Picea	425
Pickerel Weed	536
Picotee	62
Pigeon Berry	387
Pig Nut	407
Pilewort	12
Pimpernel, Bog	378
— Yellow	377
Pine, Austrian	421
— Bhotan	424
— Chili	435
— Chinese Water	451
— Cluster	422
— Corsican	422
— Kauri	438
— Knee	422
— Oregon Pitch	423
— Parasol	423
— Scotch	421
— Siberian Stone	424
— Stone	423

PIN

	PAGE
Pine, Umbrella	435
— Weymouth	424
— White	424
Pinguicula grandiflora	370
— *vulgaris*	370
Pink	65
— -root	302
Pinus	420
— *australis*	424
— Austriaca	421
— Banksiana	422
— Benthamiana	423
— *Brutia*	423
— *Bungeana*	424
— *Californica*	423
— Cembra	424
— — Helvetica	425
— — pygmæa	425
— Coulteri	424
— *densiflora*	423
— *divaricata*	422
— excelsa	424
— flexilis	425
— Fremontiana	424
— *Hamiltonii*	422
— *inops*	423
— insignis	423
— *Jeffreyi*	424
— *Koraiensis*	425
— *Lambertiana*	425
— Laricio	422
— — Caramanica	422
— — contorta	422
— — pygmæa	422
— — Romana	422
— lophosperma	425
— macrocarpa	424
— *maritima*	422
— *mitis*	423
— *monophylla*	424
— *monticola*	425
— Mugho	422
— — montana	423
— — nana	422
— — rostrata	423
— muricata	422
— *nigra*	421
— *nigricans*	421
— *Pallasiana*	423
— *parviflora*	425
— Pinaster	422
— Pinea	423
— *ponderosa*	424
— radiata	424
— *resinosa*	423
— *rigida*	424
— *rupestris*	422
— *Sabiniana*	424
— Strobus	424
— — alba	424

PIN

	PAGE
Pinus Strobus nana	424
— sylvestris	421
— — monophylla	421
— — nana	421
— — variegata	421
— *Tæda*	424
— *Taurica*	423
Piper Futokadsura	399
Piperaceæ	399
PIPTANTHUS Nepalensis	114
Piptatherum multiflorum	541
Pistachio Nut	112
PISTACIA	112
— *Lentiscus*	112
— Terebinthus	112
— *vera*	112
Pittosporeæ	60
PITTOSPORUM	60
— *coriaceum*	60
— *Sinense*	60
— *undulatum*	60
— Tobira	60
Plane, American	406
— Common	406
— London	406
PLANERA	404
— *aquatica*	405
— *crenata*	405
— *Japonica*	405
— Richardii	405
— *ulmifolia*	405
PLATANUS occidentalis	406
— orientalis	406
— — acerifolia	406
— — cuneata	406
— — laciniata	406
Platanaceæ	405
Plate-de-Corse Gourd	207
Platycodon grandiflorus	270
Platycrater arguta	185
— *Sieboldii*	185
PLATYSTEMON	37
— Californicus	37
— leiocarpus	37
Pleurisy-root	300
Plumbaginaceæ	380
Plumbago Capensis	382
— *Larpentæ*	382
Poa pratensis	541
PODOCARPUS *Andina*	455
— *Chinensis*	455
— *coriacea*	455
— Japonica	455
— *Koraiana*	455
— *nubigena*	455
PODOLEPIS acuminata	257
— *aristata*	257
— chrysantha	257
— *gracilis*	257
PODOPHYLLUM	33

POP

	PAGE
Podophyllum Emodi	33
— peltatum	33
Poison Ivy	112
Poke Weed	387
Polemoniaceæ	305
POLEMONIUM	310
— cæruleum	310
— *humile*	311
— pulcherrimum	311
— reptans	311
Polyanthus	372
POLYGALA	61
— Chamæbuxus	61
— vulgaris	61
Polygaleæ	61
Polygonaceæ	383
POLYGONATUM	529
— multiflorum	530
— officinale	530
— verticillatum	530
POLYGONUM *amphibium*	384
— Bistorta	383
— Brunonis	383
— cuspidatum	383
— orientale	384
— *Sieboldii*	383
— vaccinifolium	384
POLYMNIA *Canadensis*	241
— *maculata*	241
— Uvedalia	241
Polypodiaceæ	544
POLYPODIUM	550
— alpestre	551
— *calcareum*	551
— Dryopteris	551
— *flexile*	551
— *humile*	551
— *Lingua*	552
— Phegopteris	551
— *Robertianum*	551
— vulgare	551
— — Cambricum	551
Polypogon Monspeliensis	541
Polystichum	549
Pomegranate	195
Pontederaceæ	535
PONTEDERIA	535
— *angustifolia*	536
— cordata	536
Poor Man's Pepper	189
— — Weather-glass	378
Poppy Anemone	7
Poplar, Balm of Gilead	419
— Balsam	418
— Black	418
— Carolina	419
— Lombardy	418
— Necklace	419
— Tacamahac	418
POPULUS	417

POP

	PAGE
Populus Acladesca	419
— alba	418
— angulata	419
— balsamifera	418
— *Canadensis*	419
— *cordifolia*	419
— *dilatata*	418
— *fastigiata*	418
— grandidentata	419
— *macrophylla*	419
— monilifera	419
— nigra	418
— *nivea*	418
— *Ontariensis*	419
— pyramidalis	418
— tremula	418
— *tremuloides*	418
— *suaveolens*	419
Portulaca	74
— grandiflora	74
— *splendens*	75
— *Thellusoni*	75
Portulaceæ	74
Potentilla	147
— *alba*	148
— atrosanguinea	147
— *formosa*	148
— *fruticosa*	148
— *insignis*	148
— *Menziesii*	148
— Nepalensis	148
— *Pyrenaica*	148
— *rupestris*	148
— *Russelliana*	148
— *splendens*	148
— *striata*	148
Pourretia coarctata	469
Prim	292
Primrose, Birds'-eye	374
— Chinese	373
— Common	371
— Japanese	374
Primula	371
— *acaulis*	371
— amœna	374
— Auricula	373
— *caulescens*	371
— *cortusoides*	374
— *elatior*	371
— farinosa	374
— Japonica	374
— *minima*	374
— *Munroi*	374
— officinalis	372
— *Scotica*	374
— Sinensis	373
— *variabilis*	372
— veris	372
— *villosa*	374

PYR

	PAGE
Primula vulgaris	371
Primulaceæ	371
Prince's Feather	391
Prinos	99
Prismatocarpus	272
Privet	292
Proteaceæ	395
Proustia pyrifolia	266
Prunella grandiflora	364
— *vulgaris*	364
Prunus	140
— *Armeniaca*	140
— communis	142
— *lævis*	140
— Laurocerasus	141
— — Caucasica	141
— — Colchica	141
— — latifolia	141
— — rotundifolia	141
— Lusitanica	141
— — Azorica	141
— — myrtifolia	141
— *Mahaleb*	141
— *nana*	142
— Padus	141
— Persica	140
— *pumila*	142
— *Sinensis*	140
— *Virginiana*	140
Pseudathryrium alpestre	551
Pseudolarix Kæmpferi	433
Ptelea trifoliata	96
Pteris aquilina	545
Pterocarya Caucasica	408
— *fraxinifolia*	408
— *Japonica*	408
Puccoon	40
Pulmonaria *angustifolia*	322
— officinalis	322
— *Sibirica*	322
Punica Granatum	195
Purple Loosestrife	196
Puschkinia scilloides	525
Puya Chilensis	469
Pyrethrum	251
— *Parthenium*	253
— — *aureum*	253
— — *eximium*	253
Pyrus	171
— Aria	173
— Aucuparia	173
— coronaria	172
— baccata	172
— domestica	173
— Japonica	173
— prunifolia	172
— spectabilis	172
— *Sinensis*	172
— Torminalis	173

QUA

	PAGE
QUAKING Grass	541
Quamash	518
Queen of the Prairies	144
Queen Stock	44
QUERCUS	408
— *Ægilops*	409
— *alba*	409
— coccinea	409
— Cerris	409
— — Fulhamensis	409
— Ilex	409
— *macrocarpa*	409
— occidentalis	410
— Robur	408
— — heterophylla	409
— — pectinata	409
— — pedunculata	409
— — pendula	409
— — picta	409
— — sessilifolia	409
— — variegata	409
— *rubra*	409
— *Suber*	410
— *tinctoria*	409
Quick	174

RAGGED Robin	73
Ragwort	261
Ramondia Pyrenaica	354
Ranunculaceæ	1
RANUNCULUS	10
— aconitifolius	12
— acris	12
— Africanus	11
— aquatilis	12
— Asiaticus	10
— bulbosus	12
— Ficaria	12
— Lingua	12
— *platanifolius*	12
RAPHIOLEPIS ovata	177
Reedmace	464
Red Bryony	206
— Buckeye	106
— Campion	73
— -wood	437
— -ink Plant	387
Reine Marguerite	233
RESEDA	55
— *lutea*	55
— *Luteola*	55
— odorata	55
Resedaceæ	54
RETINOSPORA	449
— *ericoides*	450
— *leptoclada*	450
— *lycopodioides*	450
— obtusa	450
— — argentea	450

RHU

	PAGE
Retinospora obtusa aurea	450
— — pygmæa	450
— pisifera	450
— plumosa	450
— — argenteo-variegatis	450
— squarrosa	450
Rhamneæ	101
RHAMNUS Alaternus	102
— *latifolius*	102
RHEUM	384
— Emodi	385
— *nobile*	385
— palmatum	385
— *Rhaponticum*	385
— Ribes	385
— *undulatum*	385
RHEXIA Virginica	194
RHODANTHE atrosanguinea	256
— Manglesii	256
— — alba	256
— — maculata	256
— rosea	256
RHODODENDRON	279
— arboreum	281
— *argenteum*	283
— *Blandfordiæflorum*	284
— campanulatum	281
— *Campelliæ*	283
— Catawbiense	281
— Caucasicum	280
— chrysanthum	282
— ciliatum	279
— Dahuricum	282
— *Falconeri*	283
— ferrugineum	279
— *Fortunei*	284
— hirsutum	279
— *Hodgsoni*	283
— *Maddeni*	283
— maximum	281
— *Metternichii*	284
— *Nuttallii*	283
— Ponticum	280
— *Rhodora*	284
— *Windsori*	283
Rhodochiton volubilis	340
RHODOTHAMNUS Chamæcistus	284
RHODOTYPOS Kerrioides	146
Rhodora Canadensis	284
RHOPALA	395
Rhubarb	385
RHUS	111
— *coccinea*	112
— *Coriaria*	111
— Cotinus	111
— *elegans*	112
— glabra	112
— *succedanea*	112
— *Toxicodendron*	112
— typhina	112

RHU

	PAGE
Rhus vernix	112
Rhynchospermum jasminoides	300
Ribbon Grass	541
RIBES	187
— aureum	188
— *fuchsioides*	188
— *Gordonianum*	188
— niveum	188
— sanguineum	187
— — malvaceum	188
— — superbum	188
— speciosum	188
Richardia Æthiopica	461
RICINUS *Africanus*	400
— communis	400
— — major	400
— — minor	400
— — sanguineus	400
ROBINIA	125
— glutinosa	126
— hispida	125
— Pseudacacia	125
— — crispa	126
— — Decaisneana	126
— — dissecta	126
— — monophylla	126
— — monstrosa	126
— — tortuosa	126
— viscosa	126
Rock Rose	56
Rocket	49
— Larkspur	17
ROSA	148
— alpina	154
— *anemonæflora*	169, 170
— arvensis	167
— Banksiæ	170
— Belgica	158
— Bengalensis	163
— *berberidifolia*	152, 149
— *bifera*	158
— Borbonica	164
— bracteata	151
— canina	161
— Caroliniana	153
— centifolia	155
— Chinensis	164
— cinnamomea	152
— clinophylla	152
— Damascena	158
— ferox	151
— Gallica	157
— Indica	162
— Kamtchatica	151
— lævigata	170
— Lawrenciana	165
— lutea	160
— maialis	152
— micrantha	161
— *microphylla*	151

ROS

	PAGE
Rosa Monsoniæ	167
— moschata	169
— multiflora	168
— *myriacantha*	153
— Noisettiana	165
— *odoratissima*	162
— palustris	151
— Portlandica	158
— rapa	153
— *rubifolia*	169
— rubiginosa	161
— semperflorens	163
— sempervirens	168
— setigera	169
— Sinica	170
— *spinosissima*	153
— sulphurea	154
— Thoresbyana	168
— *tomentosa*	160
— *villosa*	160
Rosaceæ	139
Rose, Bay	197
— Root	190
— of the Alps	279
— of Sharon	76
— Alpine	154
— Ayrshire	167
— Banksian	170
— Bengal	163
— Bourbon	164
— Burnet	153
— Cabbage	156
— China	164
— Cinnamon	152
— Damask	158
— Dog	161
— Evergreen	168
— Field	167
— French	157
— Georgian	170
— Hardy's	152
— Hybrid Perpetual	159
— Macartney	151
— Miniature Provence	156
— Monthly	158
— Moss	157
— Musk	169
— Noisette	165
— Perpetual	163
— Pompon	156
— Portland	158
— — Hybrid	159
— Prairie	169
— Provence	156, 157
— Provins	157
— Scotch	153
— Tea	162
— Turnip	153
Rosemary	364
Rosin Weed	239

ROS

PAGE
Rosmarinus officinalis . . 364
Rowan 173
Rubiaceæ 225
Rubus 146
— arcticus 147
— biflorus 146
— fruticosus 146
— *leucodermis* 146
— odoratus 146
— spectabilis 147
Rudbeckia 242
— *angustifolia* 243
— *asperrima* 243
— *chrysomela* 243
— Drummondii 243
— *elegans* 243
— fulgida 243
— *grandiflora* 243
— *intermedia* 242
— purpurea 242
Rue 95
Ruscus aculeatus . . . 530
— *androgynus* 530
— *Hypoglossum* . . . 530
— *Hypophyllum* . . . 530
— racemosus 530
Ruta graveolens 95
Rutaceæ 95

SAX

PAGE
Sallow 416
Salvia 362
— *argentea* 363
— *bicolor* 363
— *bracteata* 363
— chionantha 362
— *coccinea* 363
— Forskœhlii 363
— glutinosa 363
— *Horminum* 363
— patens 362
— *pratensis* 362
— splendens 363
— *Verbenaca* 362
— verticillata 363
Sambucus 224
— *Canadensis* 225
— *Ebulus* 225
— *glauca* 225
— nigra 225
— — laciniata 225
— *racemosa* 225
Sanguinaria Canadensis . 40
Sanguisorba 148
Santolina *alpina* . . . 251
— Chamæ-cyparissus . . 251
— *incana* 251
— *squarrosa* 251
Sanvitalia procumbens . 247
Sapindaceæ 104
Saponaria Calabrica . . 69
— Ocymoides 69
— officinalis 69
Sarothamnus scoparius . 121
Sassafras officinale . . 393
Savin 440
Saxe-Gothæa conspicua . 452
Saxifraga 179
— Aizoon 181
— *Andrewsii* 181
— *Androsacea* 181
— *aretioides* 181
— *biflora* 180
— *cæspitosa* 181
— *ceratophylla* . . . 181
— *cernua* 180
— *ciliata* 179
— cordifolia 179
— *Cotyledon* 181
— crassifolia 179
— *Geum* 180
— granulata 180
— *Guthriciana* . . . 181
— Hirculus 180
— hypnoides 180
— *Kochii* 180
— *ligulata* 179
— *muscoides* 181
— oppositifolia . . . 180
— *purpurascens* . . . 180

SABAL *Palmetto* . . . 460
— *umbraculifera* . . 460
Sabbatia campestris . . 305
— *chloroides* 305
— *stellaris* 305
Saccharum Maddeni . . 541
Safflower 266
Sage, Jerusalem . . . 369
Sagittaria 461
— sagittifolia . . . 465
Salicineæ 416
Salix alba 416
— *aquatica* 417
— *Babylonica* . . . 417
— *cærulea* 416
— Caprea 416
— *cinerea* 417
— *elegantissima* . . . 417
— fragilis 416
— *Japonica* 417
— *pendula* 417
— pentandra 417
— purpurea 417
— *repens* 417
— *Russelliana* . . . 416
— *Sieboldii* 417
— triandra 417
— *viminalis* 417
— *vitellina* 416
Salisburia adiantifolia . . 456

SAX

	PAGE
Saxifraga retusa	180
— umbrosa	180
Saxifrageæ	178
Scabiosa *alpina*	228
— atropurpurea	227
— *arvensis*	227
— *Caucasica*	228
Scabious, Sweet	228
Scalea jacoides	257
Schistocarpha bicolor	241
Schizandra	26
— Chinensis	27
— coccinea	27
Schizandreæ	26
Schizanthus *candidus*	334
— Grahami	334
— *Hookeri*	334
— pinnatus	334
— *porrigens*	334
— retusus	334
Schizopetalon Walkeri	49
Schizostylis coccineus	471
Schœnia oppositifolia	258
Scolopendrium vulgare	546
Scorpion Grass	323
— Senna	130
Scrophularia	341
Scutellaria alpina	365
— *colerioides*	365
— Japonica	365
— macrantha	365
— minor	365
— *villosa*	365
Sciadopitys verticillata	435
Scilla	519
— *alba*	519
— *amœnula*	519
— *autumnalis*	519
— *azurea*	519
— bifolia	519
— campanulata	520
— *carnea*	519
— *cernua*	519
— Italica	520
— nutans	520
— Peruviana	520
— *præcox*	519
— *rosea*	519
— Sibirica	519
— uniflora	519
Scirpus lacustris	538
— *sylvaticus*	538
Seaforthia elegans	461
Sea Buckthorn	396
— Heath	62
— Holly	210
— Lavender	381
— Pink	380
Sedum	189
— acre	189

SMI

	PAGE
Sedum album	189
— Ewersii	190
— Fabaria	190
— *purpureum*	189
— reflexum	189
— Rhodiola	190
— Sieboldii	190
— Telephium	189
Selaginella involvens	554
Self-heal	364
Sempervivum	190
— *arachnoideum*	190
— *arenarium*	190
— *calcareum*	190
— *Californicum*	190
— *globiferum*	190
— *Ruthenicum*	190
— tectorum	190
Senecio elegans	261
— *Jacobæa*	261
— vulgaris	261
Sequoia	436
— gigantea	437
— sempervirens	437
Service, True	173
— Wild	173
Sheep Laurel	286
Sheep's-bit	272
Shepherdia	396
— argentea	397
— Canadensis	397
Sibthorpia Europæa	347
Silaus	213
Silkweed	301
Silene	69
— acaulis	71
— Armeria	70
— *inflata*	71
— compacta	70
— ornata	71
— pendula	71
— Schafta	71
Silphium laciniatum	239
Silver Berry	396
Simarubeæ	98
Siphon Gourd	207
Sisyrinchium	469
— *anceps*	470
— Bermudianum	470
— *bicolor*	470
— *Californicum*	470
— convolutum	470
— grandiflorum	470
— *odoratissimum*	470
Skimmia *fragrans*	97
— Japonica	97
— oblata	97
— *Veitchii*	97
Sloe	140
Smilacina bifolia	530

SMI

	PAGE
Smilacineæ	532
Smilax aspera	532
— *Mauritanica*	533
Smyrnium	213
Snake Gourd	207
Snake-root	383
Snake's-head	501
Snapdragon	339
Sneezewort	251
Snowball Tree	224
Snowberry	221
Snowdrop	483
— Tree	288
Snowflake, Spring	483
— Summer	484
Soapwort	69
Solanum	327
— *aculeatissimum*	328
— *auriculatum*	328
— *aviculare*	328
— *betaceum*	328
— *callicarpum*	328
— *crinitum*	328
— *Dulcamara*	327
— *galeatum*	328
— *giganteum*	328
— *glaucophyllum*	328
— *laciniatum*	328
— *macranthum*	328
— *marginatum*	328
— *nigrum*	327
— *robustum*	328
— *verbascifolium*	328
Solanaceæ	326
Soldanella alpina	377
— *minima*	377
— *montana*	377
— *pusilla*	377
Solidago	235
— *altissima*	236
— *Canadensis*	236
— *lævigata*	236
— *rigida*	236
— Virgaurea	236
Solomon's Seal	530
Sonchus macranthus	266
Sophora	136
— *alopecuroides*	136
— *flavescens*	136
— *galegoides*	136
— Japonica	136
— *pendula*	136
— *tetraptera*	137
Sorbus	171
Sour Gum Tree	217
Spanish Pink	66
Sparaxis *tricolor*	477
Sparganium ramosum	464
— *simplex*	464
Spartianthus junceus	119

STA

	PAGE
Spartium	119
— *album*	119
— junceum	119
— *multiflorum*	119
— *radiatum*	119
— *scoparium*	121
Sphenogyne speciosa	250
Spearwort	12
Specularia *hybrida*	272
— Speculum	272
Speedwell	349
Spider-wort	536
Spider Orchis	467
Spigelia Marilandica	302
Spiræa	142
— Aruncus	144
— *barbata*	178
— bella	144
— *callosa*	144
— *Cantoniensis*	145
— *chamædrifolia*	145
— *corymbosa*	145
— Douglasii	145
— Filipendula	143
— Fortunei	144
— grandiflora	144
— *Japonica*	178
— *lanceolata*	145
— Lindleyana	145
— lobata	144
— *Menziesii*	145
— Nobleana	145
— palmata	144
— prunifolia	144
— Reevesiana	145
— *salicifolia*	145
— *sorbifolia*	145
— Ulmaria	143
Spruce, Black	427
— Hemlock	428
— Norway	426
— Red	427
— White	427
Spurge	399
Squirrel-tail Grass	541
St. Bernard's Lily	527
St. Bruno's Lily	527
St. Patrick's Cabbage	180
Stachys *Betonica*	368
— *coccinea*	368
— lanata	368
— *palustris*	368
— *sylvatica*	368
Stachyurus præcox	78
Staphylea pinnata	111
— trifoliata	111
Starflower	231
Star of Bethlehem	521
— — Yellow	499
Statice	381

STA

	PAGE
Statice Ararati	382
— *Armeria*	380
— *Bahusiensis*	381
— elata	381
— *eximia*	382
— *Fortunei*	382
— *Gmelini*	382
— *incana*	382
— *latifolia*	382
— Limonium	381
— rariflora	381
Stellaria media	74
Stenactis speciosa	234
Stenocarpus Cunninghamii	395
Sterculiaceæ	84
Sternbergia *colchiciflora*	482
— lutea	482
Stipa pennatum	541
Stokesia	229
— cyanea	230
Stonecrop	189
Storax	288
Stratiotes aloides	463
Strawberry Blite	388
— Tree	278
Struthiopteris Germanica	548
Styracaceæ	287
Styrax officinalis	288
Sugar-berry	405
Sweet Bay	393
— Buckeye	107
— Gale	413
— Fern	413
— Flag	461
— Leaf	288
— Mountain Fern	550
— Violet	59
— William	65
— Willow	413
Swertia perennis	305
Sycamore, False	108
Symphiandra pendula	272
Symphoricarpus *occidentalis*	221
— racemosus	221
— *vulgaris*	221
Symphytum asperrimum	320
— Bohemicum	320
— Caucasicum	321
— *officinale*	320
Symplocos Japonica	288
— tinctoria	288
Syringa	294
— *alba*	295
— *Chinensis*	295
— *dubia*	295
— Emodi	296
— *insignis*	295
— Josikæa	296
— Persica	296
— *Rothomagensis*	295

TER

	PAGE
Syringa rubra	295
— vulgaris	294
— *violacea*	295
Tagetes	247
— erecta	248
— lucida	248
— patula	247
— signata	248
— tenuifolia	248
Tamariscineæ	75
Tamarix	75
— *Africana*	76
— *Anglica*	76
— Gallica	76
— Germanica	76
— *parviflora*	76
— *pentandra*	76
— tetrandra	76
Tamus communis	533
Taxodium distichum	451
— distichum pendulum	451
— nuciferum	451
— *sempervirens*	437
— *Sinense*	451
Taxus	453
— adpressa	454
— baccata	453
— — argentea variegata	453
— — aurea variegata	453
— — Canadensis	453
— — Cheshuntiensis	453
— — Dovastoni	453
— — elegantissima	453
— — erecta	453
— — ericoides	453
— — fastigiata	453
— — glauca	453
— — gracilis	453
— — horizontalis	453
— — Hibernica	453
— — Jacksoni	453
— — Mitchelli	453
— — nana	453
— — pyramidalis	453
— — sparsiflora	453
— — stricta	453
— *brevifolia*	454
— *cuspidata*	454
— *Japonica*	455
— *Lindleyana*	454
— *nucifera*	454
— *tardiva*	454
— *Wallichiana*	454
Tea Tree	327
Teasel	225
Tecoma *grandiflora*	352
— radicans	352
Ternstrœmiaceæ	77

TET

	PAGE
Tetilla	182
Tetragonolobus	122
TEUCRIUM	369
— Hyrcanicum	370
— *Pyrenaicum*	370
— *Scorodonia*	370
THALIA dealbata	469
THALICTRUM	5
— anemonoides	5
— aquilegifolium	5
— flavum	5
— minus	5
Thea Chinensis	78
THERMOPSIS fabacea	114
Thistle, Blessed	266
Thladiantha dubia	207
Thorn Apple	331
Thorn, Cockspur	175
Thrift	380
THUJA	443
— *aurea*	446
— *compacta*	444
— *Corrigiana*	442
— *Craigiana*	442
— *cristata*	444
— *ericoides*	444
— gigantea	443
— *gigantea*	442
— *Japonica*	446
— *Lobbii*	443
— *Menziesii*	443
— occidentalis	444
— orientalis and varieties. (See BIOTA.)	446
— *pendula*	444
— *plicata*	444
— *pumila*	444
— *pygmæa*	450
— *Sibirica*	444
— *Tartarica*	444
— *Vervæneana*	445
— *Wareana*	441
THUJOPSIS *borealis*	448
— dolabrata	445
— lætevirens	445
— Standishii	445
Thunbergia alata	356
Thymelaceæ	393
Thymus citriodorus variegatus	364
Tiarella	179
TIGRIDIA	471
— *azurea*	472
— *conchiflora*	472
— Pavonia	472
— *violacea*	472
TILIA	84
— *alba*	85
— Americana	85
— argentea	85
— *aurea*	85

TRO

	PAGE
Tilia Canadensis	85
— *corallina*	85
— *dasystyla*	85
— *euchlora*	85
— Europæa	85
— *glabra*	85
— *grandiflora*	85
— *heterophylla*	85
— *hybrida superba*	86
— *laciniata*	85
— *Mandshurica*	86
— nigra	85
— *parvifolia*	85
— *pubescens*	85
— *rubra*	85
— *tomentosa*	85
— *vitifolia*	86
Tiliaceæ	84
Tithonia splendens	245
Toad-flax	337
Tobacco, Mountain	260
TOLPIS barbata	267
TORREYA	454
— Californica	454
— grandis	454
— *Myristica*	454
— nucifera	455
— taxifolia	455
Tournefortia heliotropoides	326
TRACHYMENE cærulea	211
TRADESCANTIA rosea	536
— Virginica	536
Tree of Heaven	98
— Carnation	65
— Ferns	544
— Lotus	405
— Mallow	81
— Pæony	21
Tricholæna rosea	541
TRICHOMANES radicans	553
Trichosanthes colubrina	207
TRICYRTIS hirta	534
Trientalis Europæa	378
Trifolium elegans	121
— *incarnatum*	121
— *ochroleucum*	121
— *rubens*	121
TRILLIUM *erectum*	531
— grandiflorum	531
— pendulum	531
TRITELEIA	525
— *aurea*	526
— *grandiflora*	526
— uniflora	526
Tritoma uvaria	514
Trochostigma	78
TROLLIUS Americanus	13
— Asiaticus	13
— Caucasicus	13
— Europæus	13

TRO

	PAGE
Tropæoleæ	86
TROPÆOLUM	91
— aduncum	92
— *Canariense*	92
— edule	93
— Lobbianum	93
— majus	92
— minus	92
— pentaphyllum	93
— *peregrinum*	92
— tuberosum	93
Trumpet Flower	352
— Gourd	207
Tsuga	425
Tulip, Van Thol	498
— Turkish	498
— Tree	26
TULIPA	494
— Bithynica	498
— *Celsiana*	497
— *Gallica*	497
— Gesneriana	497
— Oculus-solis	497
— *suaveolens*	498
— sylvestris	497
— *Turcica*	498
Tunica Saxifraga	68
Tupa	272
Tupelo	217
Turban Ranunculus	11
Turnsole	325
Turpentine Tree	112
Tutsan	77
Twayblade	467
Typha angustifolia	464
— *latifolia*	464
Typhaceæ	464

UHDEA bipinnatifida	241
ULEX	120
— Europæus	120
— Hispanicus	120
— nanus	120
— *strictus*	120
Ulmaceæ	403
ULMUS	403
— *alata*	404
— *Americana*	404
— *Berardi*	404
— campestris	404
— *fastigiata*	404
— *filicifolia*	404
— *glabra*	404
— *major*	404
— *microphylla*	404
— montana	403
— *pendula*	404
— *plumosa*	404
— *racemosa*	404

VER

	PAGE
Ulmus stricta	404
Umbelliferæ	209
Umbrella Tree	205
Unicorn Plant	355
Utricularia	370
UVULARIA grandiflora	534
— *perfoliata*	534
— *puberula*	534
— *sessilifolia*	534

VACCINEÆ	274
VACCINIUM *amœnum*	275
— *corymbosum*	275
— *Myrtillus*	274
— *uliginosum*	274
— *Vitis-Idæa*	274
Valerian, Greek	310
VALERIANA dioica	226
— montana	226
— officinalis	226
Valerianaceæ	226
VALORADIA plumbaginoides	382
Venetian Sumach	111
Venidium calendulaceum	263
Venus's Flytrap	191
— Looking-glass	272
— Navelwort	325
VERATRUM album	533
— nigrum	533
VERBASCUM	336
— *acuminatum*	337
— *Blattaria*	336
— *Lychnitis*	336
— *Myconi*	354
— *nigrum*	336
— Phœniceum	336
— *pyramidatum*	337
— *Thapsus*	336
— *undulatum*	337
Verbena, Lemon-scented	359
VERBENA	357
— *alata*	358
— Aubletia	357
— chamædrifolia	357
— *Drummondii*	357
— *Mahonetti*	358
— *Melindres*	358
— *melissoides*	358
— *officinalis*	357
— pulchella	358
— *tenera*	358
— *teucrioides*	358
— *triphylla*	359
— *venosa*	358
Verbenaceæ	357
Verbesina alata	241
— *gigantea*	241
— *pinnatifida*	241
— *Sartorii*	241

	PAGE
VERONICA	349
— *amethystina*	350
— *Anagallis*	350
— *Andersoni*	350
— *Austriaca*	350
— *Beccabunga*	350
— *candida*	350
— *Chamædrys*	350
— gentianoides	349
— *incarnata*	350
— *Kermesina*	350
— *Lindleyana*	350
— longifolia	350
— *macrocarpa*	350
— *maritima*	350
— *salicifolia*	350
— saxatilis	350
— *speciosa*	350
— spicata	349
— *Teucrium*	350
— *versicolor*	350
Vervain	357
VIBURNUM Lantana	223
— *macrocephalum*	224
— *macrophyllum*	224
— Opulus	224
— *plicatum*	224
— *rugosum*	224
— Tinus	223
— — strictum	223
VIEUSSEUXIA	470
— *glaucopis*	471
— *villosa*	471
VINCA herbacea	298
— major	298
— — elegantissima	298
— minor	298
VIOLA	58
— *Altaica*	59
— calcarata	59
— cornuta	59
— odorata	59
— *palmata*	60
— *pedata*	60
— *pinnata*	60
— *Rothomagensis*	59
— tricolor	58
— — arvensis	58
— — lutea	58
Violarieæ	57
Violet, Dog's-tooth	494
— Water	379
Viper's Bugloss	320
Virgilia lutea	135
— *tinctoria*	135
Virginian Cowslip	322
— Creeper	104
— Stock	49
Viscum album	397
VITEX Agnus-Castus	360

	PAGE
VITIS	103
— *cordifolia*	104
— *Japonica*	104
— *Labrusca*	104
— quinquefolia	104
— Veitchii	104
— vinifera	103
— *vulpina*	104
Vittadina australis	234
— *triloba*	334
WAITZIA *acuminata*	256
— aurea	257
— corymbosa	256
— *nivea*	257
— *Steetziana*	257
— *tenella*	257
Wallflower	44
Wall Pepper	189
— Rue	546
Walnut, Black	407
— Common	407
Wayfaring Tree	223
Washingtonia gigantea	437
Water Buttercup	12
— Locust	137
— Milfoil	192
— Plantain	464
— Soldier	463
— Violet	379
— Willow	357
Watsonia	478
Wax Myrtle	413
Weigela	222
— *amabilis*	222
— *rosea*	222
Weld	55
Wellingtonia gigantea	437
Welwitschia	457
White Batchelor's Buttons	12
— Beam	173
— Campion	73
— Lily	505
— Thorn	174
— Water-Lily	35
Whin	120
Whitlavia grandiflora	315
Whortleberry	274
Widdringtonia	441
WIGANDIA Caracasana	315
— *urens*	315
— *Vigieri*	315
Wig-tree	111
Wild Bergamot	364
— Senna	138
Willow, American Weeping	417
— Bay	417
— Bedford	416
— Crack	416

PAGE

Willow, French 417
— Goat 416
— Kilmarnock Weeping . . 407
— Napoleon's 417
— Sallow 416
— Sweet 413
— Weeping 417
— White 416
Wind Herb 369
Winter Aconite 14
— Cherry 328
Wintereæ 23
Witsenia 478
WISTARIA brachybotrys . . 125
— *consequana* 124
— frutescens 125
— magnifica 125
— multijuga 125
— Sinensis 124
Wolf-berry 221
Wolfsbane 19
Wood Anemone 9
Woodbine 218
Wood Laurel 394
— Sorrel 94
— Sage 370
WOODSIA *hyperborea* . . . 548
— *ilvensis* 548
Woodwardia orientalis . . 546
Worm Grass 302
Woundwort 122
Wulfenia Carinthiaca . . 348

XANTHOCERAS sorbifolia . 105
Xeranthemum annuum . 264

PAGE

YARROW 251
Yellow Adder's-tongue . 494
— Archangel 368
— Batchelor's Buttons . . 12
— Flag 474
— Star of Bethlehem . . . 499
— Water-Lily 35
— -root 19
— -wort 302
Yew, English 453
— Irish 453
— Weeping 453
YUCCA 515
— acuminata 518
— aloifolia 516
— angustifolia 517
— filamentosa 516
— flaccida 517
— *glaucescens* 518
— gloriosa 517
— *obliqua* 518
— recurvifolia 518
— *rufo-cincta* 518
— *stricta* 516
— *superba* 518
— Treculeana 516

ZAPANIA *lanceolata* . . 359
Zanthorhiza apiifolia . . 19
Zauschneria Californica . . 198
Zea Mays 541
ZINNIA 240
— *aurea* 241
— elegans 241
— *Ghiesbrechtii* 241
— *Mexicana* 241

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——— Journal 20
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Autumn Holidays of a Country Parson 7
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——— Life and Letters, by SPEDDING .. 4
——— Works 5
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——— Readings for Lent 16
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